Editorial

INDUSTRY VIEWPOINTS

Small Business Needs Friends

IF ever there was a time when small business needed a friend it is now. And there is every reason why it deserves to have friends in court or anywhere else.

Small firms and enterprises taken as a whole are the backbone of this country. If they should ever go by the board it would be a sad day for all of us.

Managers of small businesses have had a tough time. Competition is keener, costs are mounting and new problems are multiplying by leaps and bounds.

Economists blithely say the inefficient must go. They say the small firms must give way to the bigger and more efficient units. Some of these experts just don't know what they are talking about.

Small plants have now had the hardest blow of all. Steel and auto unions—which one would suppose would pull for the small plants—are joining others who nonchalantly dismiss small business from the industrial picture. We now have union leaders saying that any firm which can't pay for noncontributory pensions—on the union's terms—should go out of business.

The sad part of this is that if unions have their way in the future they will pile on more social security packages on the basis of what they can wring from bigger firms. No quarter is to be given to the smaller firms nor are local conditions or special cases to be considered—if one can believe public statements of labor people.

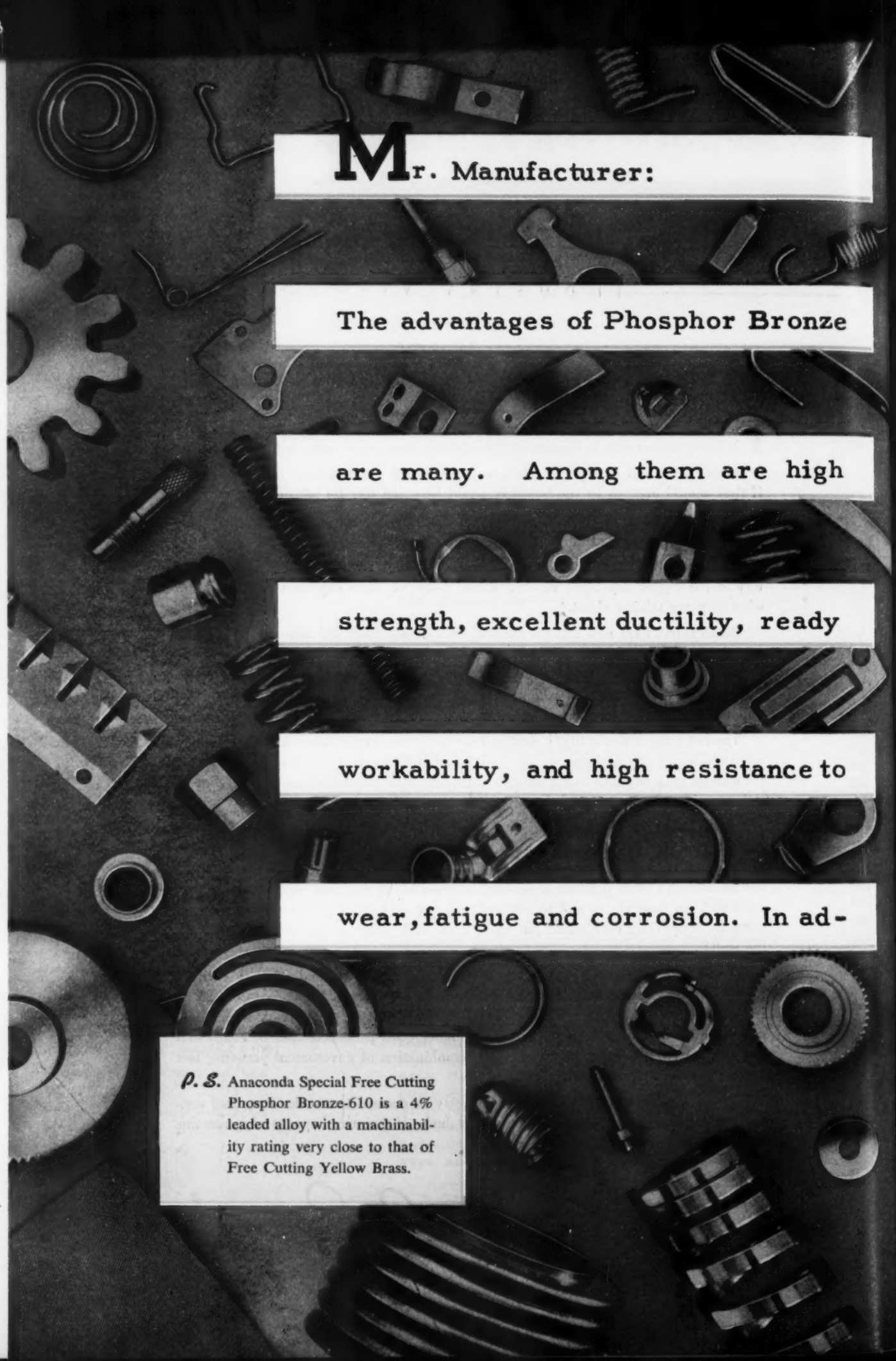
If the backbone of the nation is to be broken by higher production costs spearheaded by wages and pensions, who will benefit? Will it be the larger firms? They can't absorb workers who may be hundreds of miles away. Will it be the workers who will be laid off? Will it be the towns and villages which can't get new industries and can't pick up their stores and plants and move elsewhere? Will the union win anything by supporting moves that put small firms and plants in the red and finally to the wall?

If men who have kept plants going in the face of high costs and competition have to give up the ghost it won't be good for anyone. Efforts will be made to cut costs. New methods and programs will be launched. But what of the outlook when these managers see nothing but bigger and bigger labor costs patterned after demands that are wrung from the larger companies by a combination of government pressure, fact finding boards and nationwide strikes.

Now is the time for union and for industry in general to wonder long and seriously if they want small business to be a dead duck. If that ever happens what remains won't be good for either business or labor.

Tom C. Campbell

Editor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The advantages of Phosphor Bronze
are many. Among them are high
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workability, and high resistance to
wear, fatigue and corrosion. In ad-
P. S. Anaconda Special Free Cutting Phosphor Bronze-610 is a 4% leaded alloy with a machinability rating very close to that of Free Cutting Yellow Brass.

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NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► The 4000-hp coal burning gas turbine locomotive now being finished by Allis-Chalmers will be ready for testing in about a month. If performance comes up to expectations, fuel and maintenance costs will be lower than for any other locomotive ever built. Expectations are that fuel cost would be half that of a diesel, while lubrication would be a tenth.

► With a few exceptions, automobile manufacturers expect good business at least until the middle of next year. Right now they are watching these indications of what they consider the trend toward a "normal" market: (1) Declining used car prices; (2) lower dealer profits on used cars; (3) increased amount of car financing; and (4) a drop in car life from the 14-plus years reached during the war.

► A considerable amount of pressing and forming equipment has already been installed at the Air Forces manufacturing methods pilot plant, Adrian, Mich. The machinery, most of it used for aircraft manufacture by the Germans, includes nine vertical hydraulic presses, three extrusion presses, and two forging hammers with trim presses. When completed the shop will study high pressure forming of metals, plastics, ceramics and laminated materials.

► The world's first openhearth without buckstays--permitting charging of oversize scrap through its 21-ft door--has already made 300 heats. It is a 70-ton furnace that averages 8 tons per hr on an all cold charge.

► The steel salesmen who for the past few weeks have been gloomily telling their customers that serious damage to furnaces would be a heavy drag on the return to high production are getting red faces. Steelmaking operations are returning just as fast, perhaps a little faster, than they did after the 1946 strike.

► A Midwestern rivet manufacturing plant has slashed its manual lifting operations by 90 pct through installation of materials handling equipment such as trucks, cranes, conveyers, etc.

► The Signal Corps, which uses a lot of quartz in electronic equipment, is looking for a domestic source. It is investigating samples found in Montana and Idaho and is also trying to synthesize it. Expected limitation of the natural quartz supply has forced reduction in the size of quartz used in electronic equipment.

► Although auto builders have jumped into conversion steel in large tonnages for the first quarter, the oil and gas industry has not. Heavy tonnages of conversion steel were bought last year by both groups. Sellers of pipe for oil and gas report that buyers of these items have turned thumbs down on any conversion or premium priced steel for the present.

► Recent improvements in spectrographic analysis permit quantitative determination of magnesium ranging from 0.001 to 1.00 pct in ductile cast iron. At least four checks in duplicate can be made in an hour with 10 pct accuracy.

► Several recent dental applications point up the expanding market for carbide. It has been successfully applied to drills and is being used to tip wire cutters used on stainless and brass wire. The new cutters are said to stay sharp 10 times as long as those previously used in the profession.

for years ... the choic

NEWS ITEM

Large Order Placed For Annealing Furnaces

A contract for what is probably the largest single such commitment for coil annealing furnaces was recently placed by a large steel company.

Twenty furnaces and sixty bases are to be built by Surface Combustion Corporation, Toledo, Ohio, under the terms of this contract. The furnaces will be of the horizontal radiant tube type and will be arranged with the sixty bases in a double row, each base accommodating eight stands of coils.

The annealing covers will accommodate coils 67 inches in outside diameter which may be piled to a maximum height of 148 inches. Total charge of coiled steel per base is approximately 450 tons. This means that as much as 27,000 tons of steel may be in process at any one time.

It is believed that this is the largest single contract for such equipment ever let by a steel company.

'Surface' SERVES THE STEEL INDUSTRY

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Buyers Press Steel Salesmen

Ingot Rate Gains 17 Points

Detroit Fears Pinch in Sheets

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

THE steel shortage is back. Buyers are again camping in the offices of steel company sales managers. Inventories are unbalanced—and short in many items. Facing the facts, some steel users are revising their first quarter production schedules downward to match the amount of steel they can reasonably expect to get during the first 3 months of 1950.

Most of the facets of the 1948 steel shortage are here this week: The gray market, the conversion deal and scattered price increases by smaller steel companies. This time, however, there is a note of caution. Buyers are going slowly in ordering too much material ahead. Conversion steel is being rolled for the automobile industry and some appliance makers are looking for it. The oil and gas industry—a big conversion steel buyer last year—has turned thumbs down on it—at least for the present.

Steel Rate Nears 80 Pct Mark

Though the steel industry expects to operate at 78.5 pct of capacity this week the effects of the strike are still being felt in production and quality. While some sheets have been rolled from raw steel in process when the strike hit, most mills are now experiencing delays on sheet rolling because of the quality of the iron that has been made since they resumed production. This means there will be shipping delays, particularly in high quality steels required for deep drawing. However, most of this steel is perfectly suited for other products where the chemistry requirements are not so delicate.

Steel ingot operations for this week, at 78.5 pct of rated capacity, are 17 points better than last week's rate. Next week the rate is expected to exceed 85 pct of rated capacity, putting the industry back at its prestrike operating level.

Even though all integrated steel mills are back in production this week for the first time since the strike ended, most steel products are hard to get and will probably remain so for the next 3 or 4 months. Hot-rolled sheets are tough but cold-rolled sheets are worse. Stainless and aluminum demand are strong. Certain cold-drawn bar sizes are almost impossible to find and cold-drawn producers are promising 4 to 8 weeks delivery.

Galvanized Sheets in Third Quarter

The galvanized sheet supply picture is the gloomiest of the whole steel products list. Production has been hurt because some mills are switching over to the newer electrolytic galvanizing process. Delivery promises on orders placed now often run past next Fourth of July, though virtual completion of the grain bin storage program and collapse of freight car buying keep this picture from being even worse for the galvanized sheet buyer.

Detroit buyers expect the big pinch to come in wide cold-rolled sheets, which are made at only three mills. Although car stocks in dealers' hands have been rising rapidly automotive men are optimistic on sales. But during the strike they ran for 5 to 6 weeks with less than 10 pct of their normal steel deliveries. Generally, their inventories have been cut by that amount and some 6 week's of lost output has been thrown ahead of mill delivery schedules.

Nonferrous Metals Markets Weaker

The spurt of strength shown in the nonferrous metals markets early this month is no longer in evidence, copper excepted. With heavy imports, lead fell to 12¢ per lb, against a price of 15⅛¢ late in September. RFC dropped its tin price to 85¢ per lb this week, off 10¢ per lb from its last quoted price—a reflection of weakness in London. The attempt to raise the price of zinc to 10¢ a lb East St. Louis failed in the absence of sustained demand.

Steelmaking scrap prices were generally firm this week but there is no sign of the runaway market speculators expected. In Cleveland, where No. 1 heavy melting steel scrap jumped $6 a ton last week on a big purchase, it turned soft this week. And 20,000 tons were bought at Buffalo during the past week at an increase of only $1.50 over the previous quotation.

for years ... the choic

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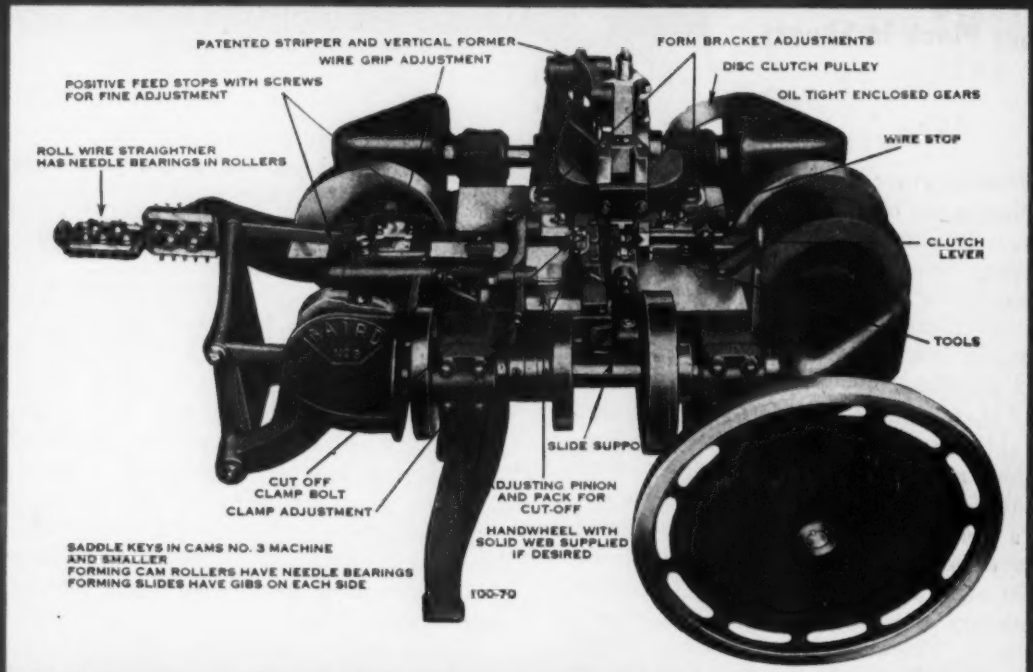
Automatic WIRE AND RIBBON METAL FORMING MACHINES

For High Production of those Wire and Ribbon Metal Articles which can be made to best advantage on a four slide machine.
By this we mean without having to use "cluttered up" tooling.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WIRE GRIP ADJUSTMENT
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HANDWHEEL WITH SOLID WEB SUPPLIED IF DESIRED
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100-70

BAIRD Automatic MULTIPLE TRANSFER PRESSES

For those parts made from ribbon metal which can be made to best advantage on this Baird Multiple Transfer Press.

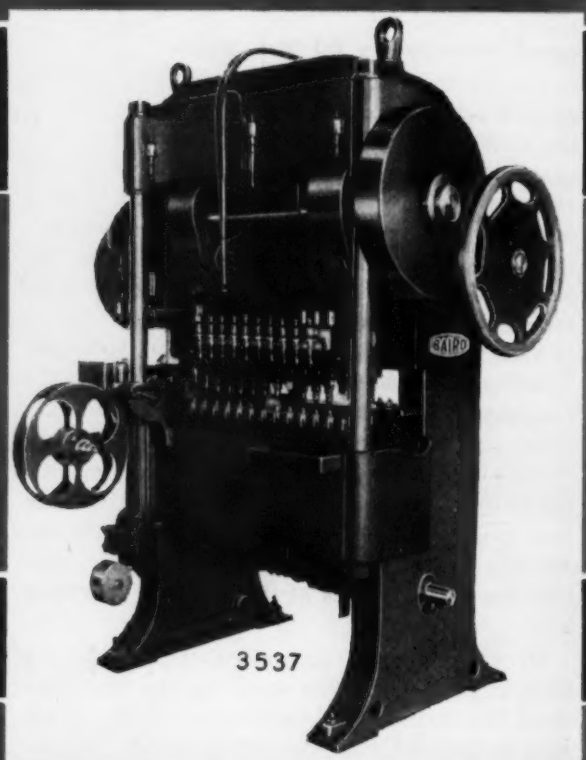
Tools plainly visible and easily accessible.

Different combinations of crank and cam gate shafts, roll and slide feeds, Dc to best suit the job at hand.

5 SIZES

Send your samples and prints and quantity requirements and

"ASK BAIRD ABOUT IT"



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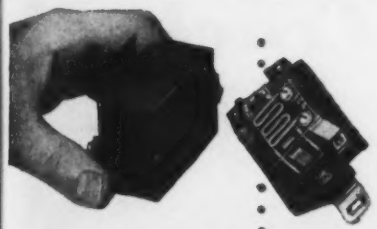
1700 STRATFORD AVENUE • STRATFORD, CONN.

Baird also builds High Production Machine Tools. Multiple Spindle Chucking Machines, Grinders, Oblique and Horizontal Tumbling Machines.

INCREASED VALUE

no increase in price

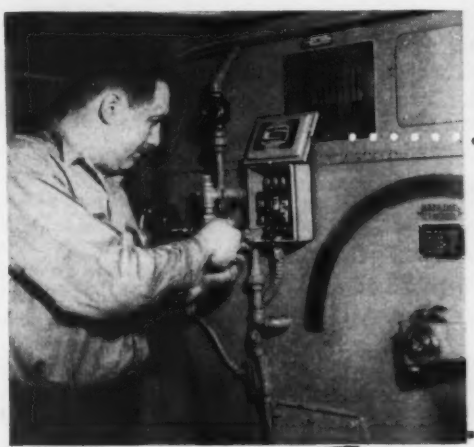
manual motor starters...



.... feature quick, easy installation; positive overload protection with long-life bi-metallic relays; easy wiring and servicing because terminals are wired from the front. Application—fractional and integral motors up to 7½ horsepower.

The CR1061 controls a handkerchief ironer in a modern laundry.

The CR1062 is easy to mount and wire. Used here on a coolant pump.



Roomy, attractive case can be mounted on or beside the machine. Sturdy switch mechanism resists vibration. New push-button as well as toggle-type forms now available for integral motor starting. All forms—watertight, dust-tight, and explosion-proof—available in both lines. Write now for more information. *Remember, these new starters have all the features you've been wanting at no increase in price.*

General Electric Company
Apparatus Dept., Sec. M730-9
Schenectady 5, N. Y.

Please send me—
Bulletin GEA-2234E on CR1061 Fractional-hp Motor Starters
Bulletin GEA-1522F on CR1062 Integral Motor Starters

NAME .....

COMPANY .....

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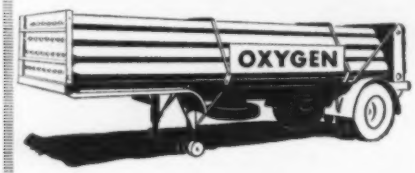
GENERAL ELECTRIC

WHO PAYS THE FREIGHT?



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BY THE CUBIC FOOT

OXYGEN

BY THE TON

The handling of oxygen is a large part of the cost to most oxygen users — and you can ELIMINATE HANDLING COSTS FOR OXYGEN.

With Air Products generators, you take oxygen from the air and push it right through your pipe lines. You assure your supply at low cost, because with these generators there is

NO FREIGHT COST
NO HANDLING
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If you use over 200,000 cubic feet of oxygen per month, it will pay you to get full information about Air Products generators and our lease plan. Write today, at no obligation.

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Assure Your Supply at low cost with

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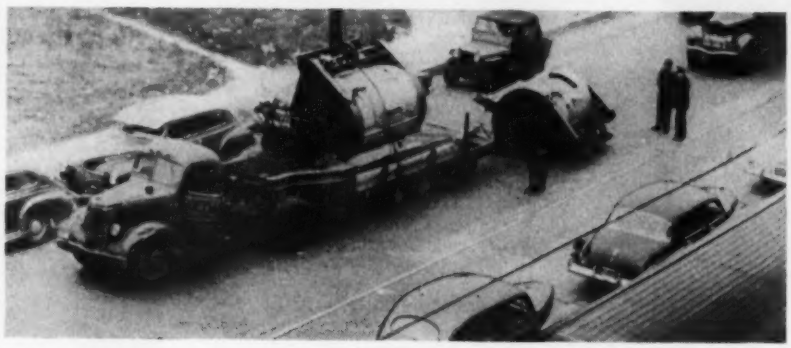
Fatigue Cracks

By *Charles T. Post*



Wash Sale

From all this talk we've been hearing about a buyers' market we'd just about concluded what the grizzled old sales managers were saying was true—to get sales you have to go out and beat the bushes.

Your favorite family journal's Chicago business manager was doing a little sales prospecting on his own when he walked right into the middle of a situation to disprove the rule. A big truck carrying two 3½ ton commercial laundry machines, secured only by manila rope well past the retirement age, stopped suddenly in front of the Western Ave. plant of Signode Steel Strapping Co. There, of all places, the manila rope gasped its last breath, and one of the big machines tumbled off onto the pavement.

In no time at all traffic was stalled completely and the entire Signode personnel was at the windows. The engineering department's Herb Fiedler grabbed his camera to preserve for posterity the horrible and costly object lesson of what happens when steel strapping should be used and isn't. The general reaction was a mixture of sympathy and scorn.

Later, while a winch from the truck-tractor was attempting to drag the derelict to one side, a construction company crane lumbered up looking for business—just like the sales managers advise.

The logical footnote would be a report that the entire Signode sales staff swarmed out of the office and got the trucking company to use Signode strapping forever after. The report we get didn't say anything like that, so we're forced to assume that they missed the sale because they were all out beating the bushes for business.

Classified

Our firm belief that classified advertisements constitute a running commentary on the mores and culture of our times was in no way shattered when the brains department's Ernie Kopecki called our attention to a section of the monthly calendar of the Technical Societies Council of New Jersey.

Interspersed with serious advertisements seeking positions and offering equipment for sale are the following:

Turn to Page 130

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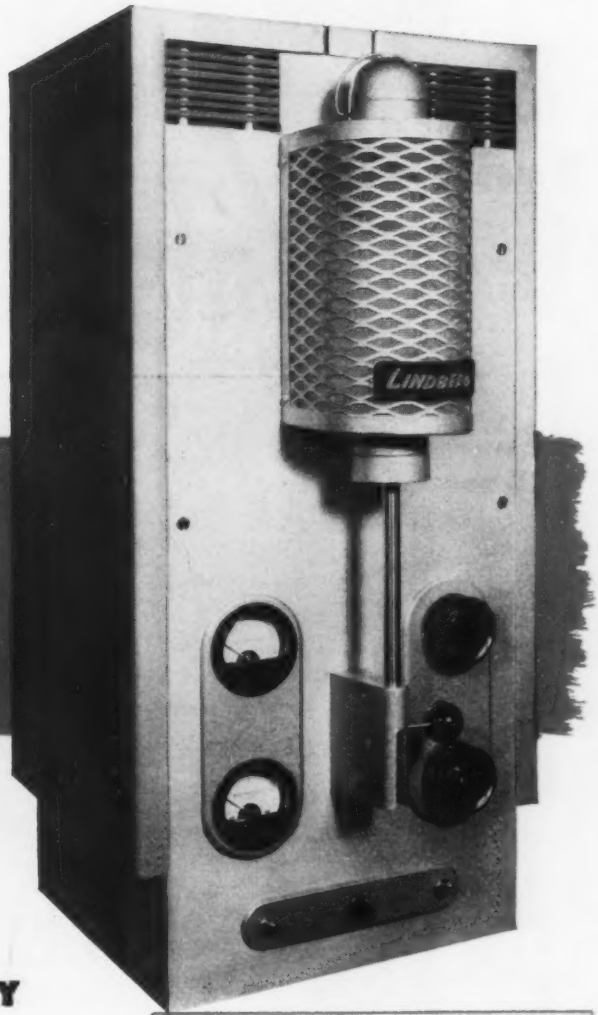
NOW...

CARBON ANALYSIS

in a FLASH



...ELECTRONICALLY WITH NEW STANDARDS OF ACCURACY

- Ready in the morning in 57 seconds. Instantly from then on.
- 90% less power consumption.
- No limit on temperatures.
- Glass combustion tube provides visibility of operation.
- Combustion tubes at half the cost, last many times longer.
- Shorter tube advantageous for volumetric method.
- No elements to burn out.
- Heats nothing but the sample.
- Eliminates excess heat from laboratory.

For further details ask for Bulletin 910.

VOLUMETRIC
GRAVIMETRIC

	for...
Carbon	Steel
Sulphur	Cast Iron
	Alloys
	Stainless

LINDBERG LABORATORY DIVISION

Lindberg Engineering Company • 2452 West Hubbard Street • Chicago 12, Illinois

Iron Age Introduces

HARRY C. PLATT, vice-president, Engineered Castings Div., American Brake Shoe Co.

WILLIAM H. STARBUCK, vice-president, Kellogg Div., American Brake Shoe Co.

W. E. LUNGER, assistant vice-president in charge of production, American Car & Foundry Co.

Harry C. Platt has been appointed vice-president of the Engineered Castings Div., AMERICAN BRAKE SHOE CO., New York, and **William H. Starbuck** has been appointed vice-president of the Kellogg Div. of the company. Mr. Platt, formerly works manager, has been with Brake Shoe since 1942. Mr. Starbuck, formerly assistant general sales manager, served in the sales departments of other devisions of the company before joining the Kellogg Div.

G. Grame Wheeler has been appointed New York retail sales manager of the PACKARD MOTOR CAR CO., INC., Detroit. Mr. Wheeler has been with Packard since 1935 except for two years as director of economic rehabilitation of the Eastern Carolina Islands for the Reconstruction Finance Corp. and his wartime service.

Robert Lindley Murray has been elected director of the DETREX CORP., Detroit. Mr. Murray is also executive vice-president and a director of Hooker-Electrochemical Co., Niagara Falls, N. Y., vice-president and director of Hooker-Detrex, Inc., a jointly owned subsidiary of the Hooker and Detrex companies; and a director of the Power City Trust Co., Niagara Falls, N. Y.

Eugene P. Berg has been appointed to the newly created position of assistant general manager of the Pershing Road plant of LINK-BELT CO., Chicago. Mr. Berg was formerly general superintendent at Pershing Road. **Richard Moyer** has been appointed general superintendent, manufacturing department of the company. Mr. Moyer was formerly superintendent of the steel shop for Link-Belt.

W. E. Lunger has been appointed assistant vice-president in charge of production for AMERICAN CAR AND FOUNDRY CO., New York. Succeeding Mr. Lunger as district manager of the Huntington, West Virginia plant is **J. E. Koontz**, now assistant district manager of that plant. Mr. Lunger joined ACF in 1914 as a shop apprentice and has held various positions with the company prior to his new appointment. Mr. Koontz has been with the company since 1917.

Elmer F. Franz has been elected treasurer of the YALE & TOWNE MFG. CO., New York, succeeding **Fred Dunning**, who will devote full time to his increased responsibilities as executive vice-president and secretary. Mr. Franz was formerly comptroller of the Weatherhead Co., Cleveland.

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NIAGARA

Announces a New, Low-Priced

POWER SHEAR FOR LIGHT SHEET METAL

Here is the new high speed Power Shear that sheet metal men have been waiting for. New advanced engineering . . . new styling . . . new, easy, fast operation.

THE GREATEST DOLLAR for DOLLAR SHEAR VALUE YOUR MONEY CAN BUY

This new Niagara high speed Power Shear is designed for light sheet metal work. One look at its distinctive styling indicates its modern performance.

Fabricated from unbreakable steel plate, it is engineered to combine strength and stiffness for accurate cutting.

Clear visibility of cutting line through cut-outs and over the top of holddown facilitates shearing to an accurate layout line.

Niagara Alloy Tool Steel Knives heat treated to a high degree of hardness and toughness and precision ground for accuracy provide keen cutting edges for longer service between grinds.

Quick Acting Back Gauge and convenient front and side gauges.

Capacity—20 gauge.
30, 36 and 42 inch cutting lengths
125 cuts per minute.

Write for complete information and low prices

See how the new PANCAKE MOTOR DRIVE provides the most compact construction ever obtained . . . minimum floor space, maximum safety.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, NEW YORK

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK

GLOBAL LETTER

REVIEW OF WORLD MARKETS

Anglo-American Council on Productivity reports on our advantages gained from simplification . . . French steel industry doing well . . . German output slumps.

London — A special group appointed by the Anglo-American Council on Productivity "to investigate and report upon the methods which industry in the United States has employed to limit the diversity of types of products, to consider the effect on productivity and cost and to recommend how far and by what methods the experience of industry in the U. S. can be applied with advantage in the United Kingdom," has now reported.

The advantages of simplification may be briefly summarized as follows:

To the Producer—Longer runs with fewer changes on the production line; reduced tooling and setup time; possibilities of increased mechanization and special purpose plant; easier training of operatives; simpler and cleaner inspection; less capital invested in idle plant, tools, and space; reduction of stocks of materials, components, and end products; reduced call on drawing office and design staff for special orders, leaving them free for work on new designs or improvements; simpler clerical and administrative work; easier service and maintenance; concentration of sales and advertising effort on a narrower range; and, hence, increased productivity leading to reduction in costs and prices and to increased sales.

To the User—Lower price for a given quality or performance; reduced variety and level of stocks at all distribution points; readier availability; improved service and maintenance facilities.

Trade Press Gets Credit

The group found that simplification is a well-established practice in American industry. Much of the initial impetus was imparted by an investigation into elimination of waste in industry in 1921 on the inspiration of Herbert Hoover.

From that time trade associations carried on the work. But in recent years their activities have been somewhat inhibited by fear of the anti-trust laws. A great deal of work has been carried on by individual firms.

The technical and trade press of America made a substantial contribution by giving publicity to successful efforts of industries and individual concerns. Generally, manufacturers in the U.S.A. are willing to have their work and its results widely publicized. This is deemed to be an important factor in the development of high productivity and low cost.

French Industry Doing Well

Paris—French steel production is showing good progress. Crude steel output reached 809,000 metric tons in October, compared with a monthly average of 755,000 tons during the first 9 months of the year, and a monthly average of 603,000 tons in 1948.

Including the Saarworks, the French steel industry is running at the present time at an annual rate of 11.5 million tons. In 1945 total output was 1,670,000 tons. Total production for 1949 is expected to be about 11 million tons, compared with 8,463,000 tons in 1948. This would be an increase of 29 pct over last year.

German Steel Output Slumps

Frankfort — After reaching a postwar high of 845,000 tons in August, output of the German (trizone) steel industry has decreased for two consecutive months. In September production declined to 760,077 tons. The trend continued in October when, according to preliminary figures, output fell to 693,435 tons. German steel circles expect November production to be about 700,000 tons, provided customers are able to finance their purchases.

Pressure to increase export quotas is reported to have been successful and a quota of 900,000 tons is said to have been fixed for iron and steel products during 1949-50.

Luxembourg Output Also Down

Luxembourg—First reports on Luxembourg steel output in October show no sign of improvement, as 142,000 tons have been reported. This compares with 155,000 tons in September and the peak level of 254,000 tons reached last March. Present output is under the monthly level of 200,000 tons in 1948 and the monthly rate of 141,000 tons in 1947.

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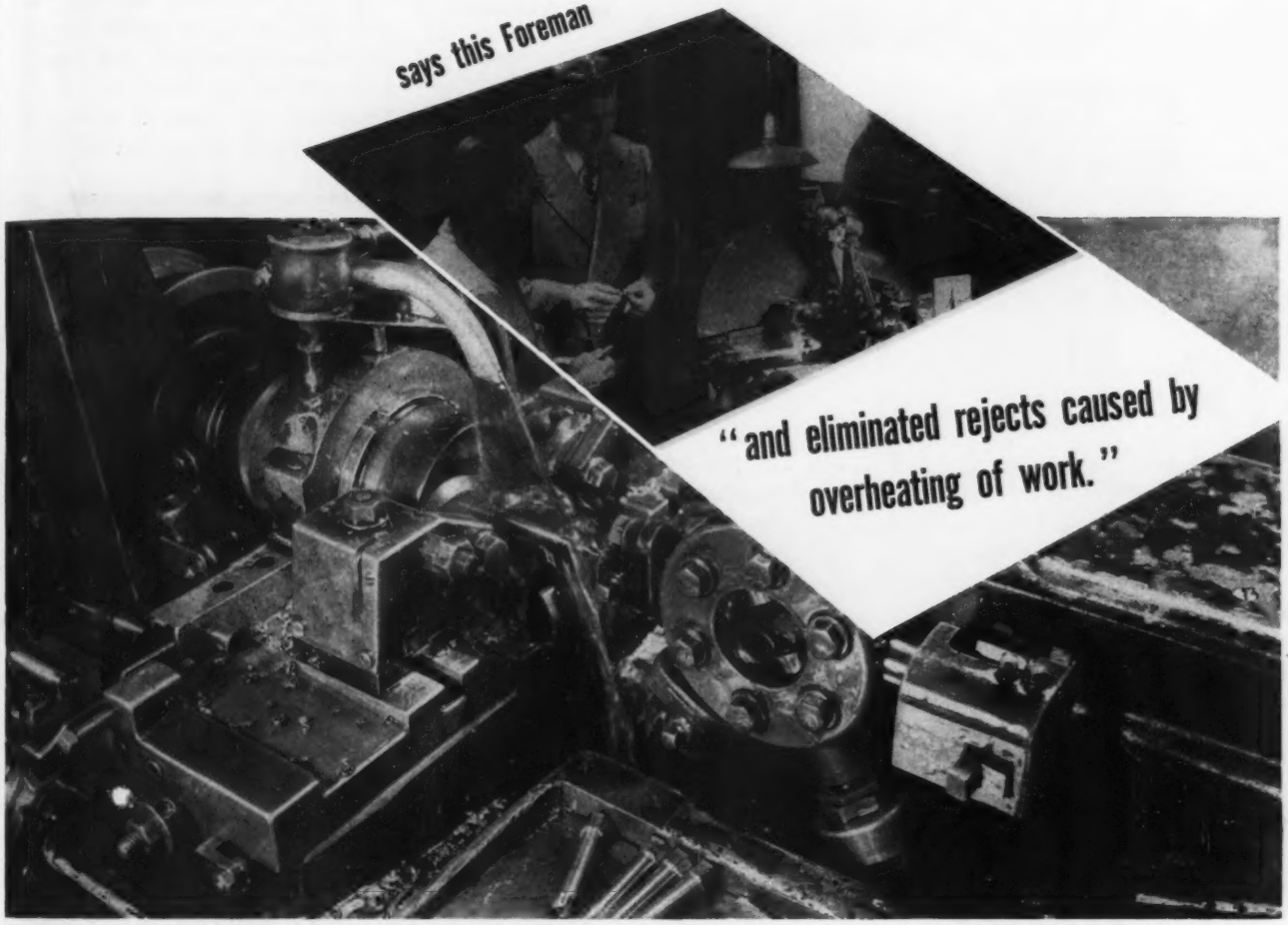
"With GULF CUT-AID we increased drill life on brass bolts more than 100%"



The foreman of this modern machine shop consults with a Gulf Lubrication Engineer on results with Gulf Cut-Aid in machining small brass parts.

"We've found that Gulf Cut-Aid is the ideal cutting fluid for most nonferrous metals," says this Machine Shop Foreman. "With competitive oils, we had trouble getting penetration into the hole while drilling, and our tool life was unsatisfactory. Now with Gulf Cut-Aid we drill a thousand pieces before regrinds are necessary. Also, because of the exceptional cooling properties of Gulf Cut-Aid, we have no difficulty holding tolerances to specifications."

Here's why Gulf Cut-Aid is setting new performance records for machining operations on many types of nonferrous metals: (1) outstanding penetration and surface wetting properties, (2) high cooling ability—approaching that of soluble oil emulsions, (3) transparent, permits visual inspection of work.

It will pay you to investigate the advantages of this revolutionary cutting fluid for nonferrous metals in your shop. Write, wire, or phone your nearest Gulf Office today and ask the Gulf Lubrication Engineer to call.

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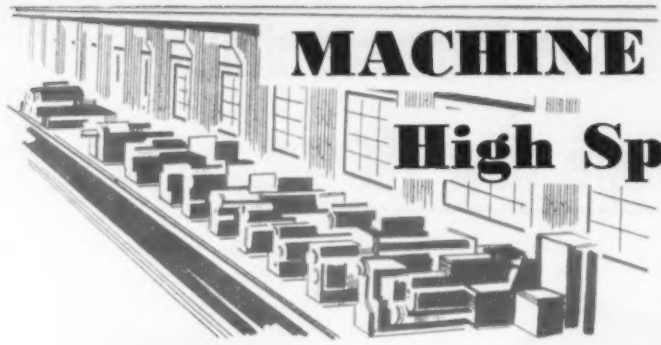

MACHINE TOOL High Spots

Sales Inquiries and Production

Steady improvement in new order volume predicted . . . Auto producers placing inquiries . . . Replacement buying picking up.

by

William A. Lloyd

Cleveland—Steady improvement in new order volume lasting through the first quarter of 1950 was predicted this week by spokesmen for major segments of the machine tool industry.

Despite recent pronouncements that capital goods producers, including machine tool builders, faced a possible 15 pct drop in demand next year, industry sources indicated that if only part of the projected programs requiring tooling, develop, the machine tool industry will have good business for several months to come.

Detroit Outlook Promising

In Detroit, important segments of the machine tool industry report a recent increase both in the number of placements and the number of new inquiries received. In addition to activity by several major producers in the motor car industry, there are indications that significant buying by local tool and die shops could develop within the next 3 to 6 months.

While some suppliers have not benefited by the recent upswing here, few machine tool sources have failed to improve their volume in recent months, according to informed trade experts.

Ford Placing Inquiries

Probably the most active program at the moment involves tooling for the new Ford automatic transmission. Inquiries for this job are being placed by the Mound Road division. Final assembly of the Ford transmission, of which half the required volume will be built by Ford, will be at Cincinnati.

Kaiser-Frazer's plans for its new lines of cars are not yet clear, although some activity, believed to involve the K-F engine, has been reported this past week.

Some observers here are of the opinion that Chrysler may build a new engine plant at its Jefferson Ave. location. Plans for the engine or engines have not been finalized, it is reported, although inquiries are coming in. Some trade sources believe a final decision on this program will not be reached before the end of the year.

Buyers Become Cost Conscious

Current reports indicate that good production equipment capable of showing a substantial reduction in production costs continues to be of paramount interest to local tool buyers. Transfer and other special equipment capable of producing large savings continues to hold attention, although placements are few and far between, according to local trade sources.

An encouraging aspect of the present tooling picture is the revival of interest in new equipment exhibited by small plants. This is always an encouraging factor in Detroit and the recent revival of interest has been a source of encouragement to many Detroit dealers and distributors.

Several local tool sources have indicated that October volume has been the highest for the year to date. Present indications are that November will equal if it does not exceed the October volume.

Replacement Buying Rises

In Cleveland, while no tooling programs of great magnitude are on the horizon at the moment, replacement buying has been picking up. Producers have a large amount of equipment on quotation at plants where the requests for appropriation money are in the mill, but the bulk of this large potential volume is developing slowly.

In the East, although the machine tool business is a far cry from the wartime peak, order volume is sufficiently better than it was during the early months of this year to lend considerable comment and provoke some optimism.

There has been some export business, but this has not measured up to what the industry had expected to develop before the close of 1949. Export business for some segments of the industry was on the brink of increasing when currency devaluations in Europe and South America upset the applecart.

No "Block Sales" Reported

Current tool sales are largely domestic. No individual machine tool builder reports block sales to any metalworking company. But some firms are buying one to a half dozen machines.

As an example, The Mathewson Machine Works, Inc., North Quincy, Mass., will spend about $50,000 in the next 6 months for additional machine tool equipment, such as a large type mill, equipment for jig boring, gear shaping and spot welding, in addition to turning and grinding equipment.

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Only MARVEL *builds all four**

***HACK SAWING MACHINES**

***BAND SAWING MACHINES**

***BAND SAW BLADES**

***HACK SAW BLADES**

While it is true there are several builders of hack sawing machines and many builders of band sawing machines, only MARVEL builds *BOTH* hack saws and band saws. The fact is that MARVEL manufactures 35 models of 10 basic types of metal sawing machines which include the world's fastest automatic production saw, the world's largest giant hydraulic hack saws, the world's most versatile band saw and the most widely used small shop saws.

With intimate and broad field experience in all types of metal cutting-off equipment and 35 different saws available, it is obvious that MARVEL Field Engineers occupy a unique and exclusive position in the industry. They are eminently qualified to make expert and *unbiased* recommendations covering the type, size and model of metal sawing equipment best suited to individual requirements—the most efficient, most accurate, fastest, broadest in scope and the most economical.

MARVEL is also the only manufacturer of both metal sawing *machines* and metal sawing *blades*. Because the efficiencies of both the machine and the blades are interdependent, each upon the capability of the other, expert knowledge covering both saws and saw blades is essential to the proper appraisal of any specific sawing situation. Correct balance of cutting speed and blade life, feed pressure and blade tension are all potent factors in over-all performance. Here again it is the MARVEL Field Engineer who is qualified to provide the comprehensive answer to your question. His job is to help you saw metal most efficiently—his services are available upon request—gratis.

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No. 9A Marvel Hack Saw
No. 8 Marvel Band Saw
MARVEL High-Speed-Edge HACK SAW BLADE
MARVEL Metal-Cutting BAND SAW BLADE

FREE — USE POST CARD

PUBLICATIONS

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

Centrifugal Blowers

Completely revised 24-p. booklet gives details, photos, and text describing centrifugal blowers and exhausters. *Roots - Connersville Blower Corp. For more information, check No.* 1 *on the postcard.*

Fatigue Testing Machines

Fatigue testing machines for plate and sheet stock are described and illustrated in 12-p. bulletin. *Krouse Testing Machine Co. For more information, check No.* 2 *on the postcard.*

Abrasive Floor Plate

New 8-p. booklet in two colors describes and lists uses of steel floor plate into which is embedded abrasive grains to prevent slipping. *Alan Wood Steel Co. For more information, check No.* 3 *on the postcard.*

Industrial Plants

A new 12-p. booklet lists the consulting, engineering, and manufacturing services of firm that designs completely equipped plants, production lines, special machines, and heat treating equipment. *Continental Industrial Engineers, Inc. For more information, check No.* 4 *on the postcard.*

Non-Ferrous Handbook

Designed to take the guesswork out of selecting and ordering nonferrous alloys, a 44-p. pocket-size ordering guide has just been published, giving the advantages, applications, composition, forms, properties, and manufacturing limits of Riverside alloys. *Riverside Metal Co. For more information, check No.* 5 *on the postcard.*

High Speed Steel

Unicut, a new general purpose high speed steel, is described in 4-p. pamphlet. *Universal-Cyclops Steel Corp. For more information, check No.* 6 *on the postcard.*

Materials Handling Tools

Attachments, tools and accessories designed to lower the cost and increase the ease of handling materials with Hyster lift trucks, straddle trucks, and mobile cranes are described in 28-p. catalog. *Hyster Co. For more information, check No.* 7 *on the postcard.*

Electronic Controls

New 65-p. book, "Cutting Production Costs with Electronic Controls" contains 45 case studies describing examples of cost saving production techniques. *Photoswitch Inc. For more information, check No.* 8 *on the postcard.*

Tubing

Cold drawn stainles steel tubing ranging from 0.008 to 1 in. OD is described in a new 8 p. bulletin. Types of steel and descriptions of mechanical, capillary and hypodermic tubing, along with finishes and tolerances, are included. *J. Bishop & Co. Platinum Works, Stainless Steel Products Div. For more information, check No.* 9 *on the postcard.*

Grooved-Wheel Casters

The latest information on V-grooved wheel casters for angle iron track is described in 8-p. folder. *Bassick Co. For more information, check No.* 10 *on the postcard.*

New Alloy Steel

Jalloy, a high tensile, low alloy steel capable of being heat-treated to excellent physical properties, is described and illustrated in 36-p. brochure in color. *Jones & Laughlin Steel Corp. For more information, check No.* 11 *on the postcard.*

Carbide Dies

Six case studies that show how carbide dies increase production, reduce costs, and improve quality are reported in a new 12-p. brochure. *Lincoln Park Industries, Inc. For more information, check No.* 12 *on the postcard.*

Plastic Lined Pipe

Technical data on Saran lined steel pipe and fittings are included

Turn to Page 116

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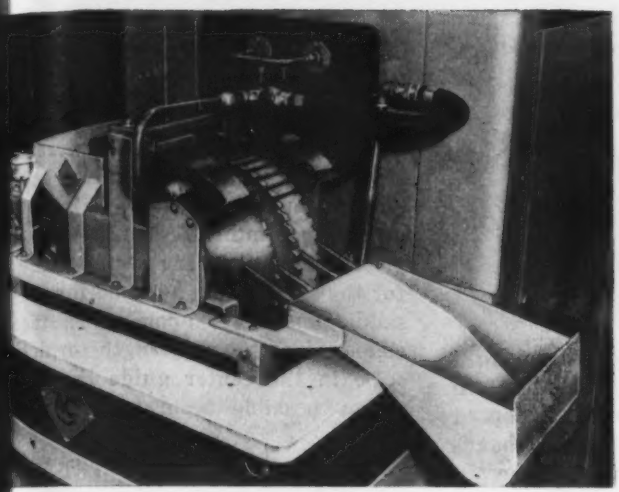
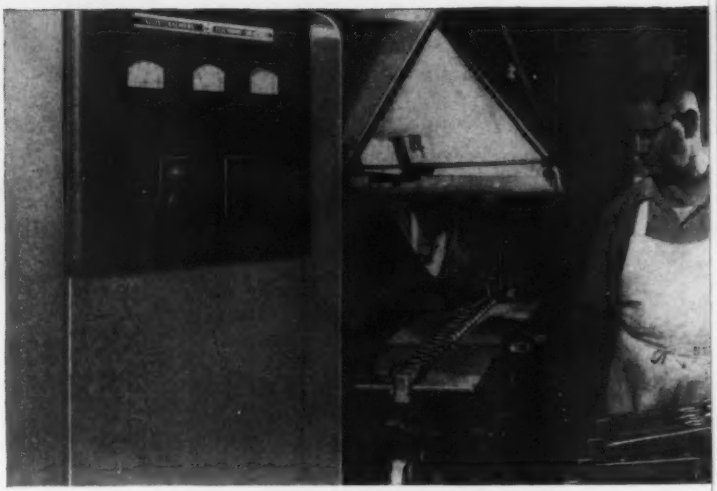
Induction Heaters Lick 4 Tough Jobs



Hardening Problem: Harden valve lifter rods on each end to prevent mushrooming and undesirable wear.

Solution: Induction heat hardens ends of 3600 rods per hour to full hardness.

Idea: Ask about induction hardening of valve stems, crankshafts, piston pins, valve rockers, spline shafts.



Soldering Problem: Soft-solder bellows into oil gauge case without affecting temper of bellows, and cut rejects due to leaking seals.

Solution: Induction soldering reduced processing costs and whipped reject problem. Temper of bellows unaffected.

Idea: Ask about induction soldering of cans, nameplates.

Heating Problem: Heat each end of steel strip for baby buggy springs to facilitate forming.

Solution: Standard Induction unit heats spring to 300° F in 16 seconds, eliminates reheating — reduces scaling.

Idea: Ask about induction heating for forming wrench sockets or other unusual through heat jobs.

Annealing Problem: Anneal edges of pots and pans prior to rolling of edge. Require high production.

Solution: Induction heaters cut annealing time to less than 10 seconds each. Permitted use of unskilled operator.

Idea: Ask about annealing threads, flexible tubing fittings, or localized annealing prior to forming.

EXPERT ENGINEERING HELP: Allis-Chalmers engineers and methods experts will completely process samples of your work . . . suggest and design simple, effective work handling equipment, and quote per piece production and equipment costs. Standard ratings: 1, 2, 10, 20, 50, 75, 100, and 200 kw.

Check with your nearby Allis-Chalmers representative regarding this offer — or write direct.

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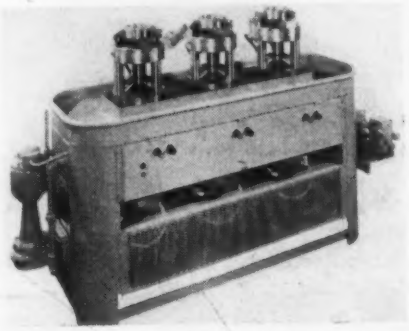
moisture laden air in and around the container. *Celler Engineering Associates. For more information, check No. 26 on the postcard on p. 35.*

Tapping Machine

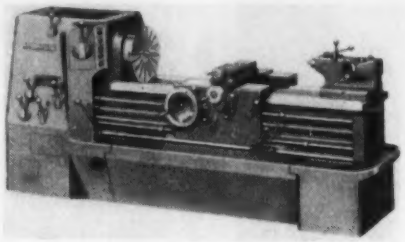
Collapsible taps ranging from 1½ to 4 in. and used for tapping gas cylinder caps and large pipe fittings are handled in the new Tapmaster No. 40. Taps are actuated by a cam instead of the conventional lead screws, allowing a rise after the



tapping operation so that the facing or chamfering of the lower surface of the work can be accomplished by tools attached directly to the tap. Machining of the bottom surface is done during the tapping cycle. The use of collapsible taps is said to step up production to 500 pieces per hr and abrasions that occur on the chasers of solid taps during the threading out process are said to be eliminated. *D. H. Prutton Machinery & Tool Co. For more information, check No. 27 on the postcard on p. 35.*

Heavy Duty Lathe

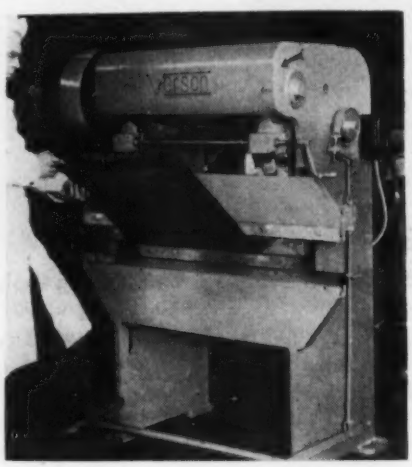
Rigidity, broad feed and speed ranges for all types of work, convenience for operation, and lubrication facilities and design to minimize wear and maintenance feature the new 16-in. Model S lathe. An exceptionally heavy spindle with 24 speeds is mounted on three heavy duty bearings. The hole through the spindle can be slightly in excess of 2 in. when required. Heavy hardened and ground gears give a speed range of 15 to 1000 rpm and a multiple disk wet-type combina-



tion clutch and brake running in a bath of oil controls the spindle. Two levers control the entire 24 speed changes. A tailstock with the handwheel offset 50 deg toward the operator has two-speed action for slow drilling feeds and rapid advance. Power rapid traverse and main drive motors are mounted in the cabinet leg. *Springfield Machine Tool Co. For more information, check No. 28 on the postcard on p. 35.*

Press Brake

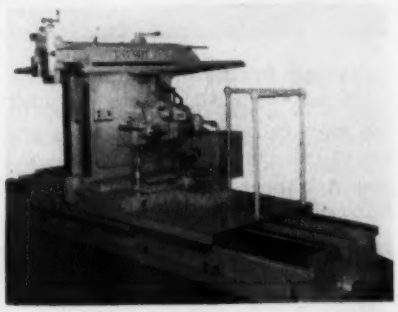
A new powered press brake suitable for most types of metal forming ordinarily performed on press brakes has a bed and ram 48 in.



long. Rated air bending capacities range from a 48-in. length of 16 gage stock (over a ½-in. opening) to a 24-in. length of 10 gage stock (over a 1⅛-in. opening). Unit all steel construction assures perfect alignment and maximum rigidity. All gears are steel with machine cut teeth. Totally enclosed friction clutch and self-releasing band brake are employed. Variable speed arrangement provides 20 to 50 strokes per min operation. The machine may be mounted on casters for portability. *Verson Allsteel Press Co. For more information, check No. 29 on the postcard on p. 35.*

Traveling Shaper

A new type traveling shaper with 8-ft table travel has a 36-in. ram stroke with hand or power feed and power traverse speeds of 8 to 102 strokes per min. It has two complete automatic oiling systems, one for the shaper ram and one for the saddle and ways upon which the shaper rides. A full length vernier scale in the center guide bearing makes possible accurate settings.



The machine has been designed for machining long, interrupted surfaces that do not lend themselves to planing. *Cincinnati Shaper Co. For more information, check No. 30 on the postcard on p. 35.*

Universal Chuck

A versatile 3-jaw universal chuck is said to combine the speed of a lever-operated chuck with the powerful grip of a pinion-operated chuck. Speed is made possible by inserting the end of a wrench stem into any of six holes in the OD of the scroll and then rotating the scroll rapidly by lever action. To secure a final tight grip of the jaws, the wrench stem is slipped into any one of six additional holes adjacent to the scroll engaging the pinion on the wrench with the bevel gear teeth at the back of the scroll. A light turn rotates the scroll and results in a powerful grip of the jaws. Called Westcott 75, the chuck has

Turn to Page 117

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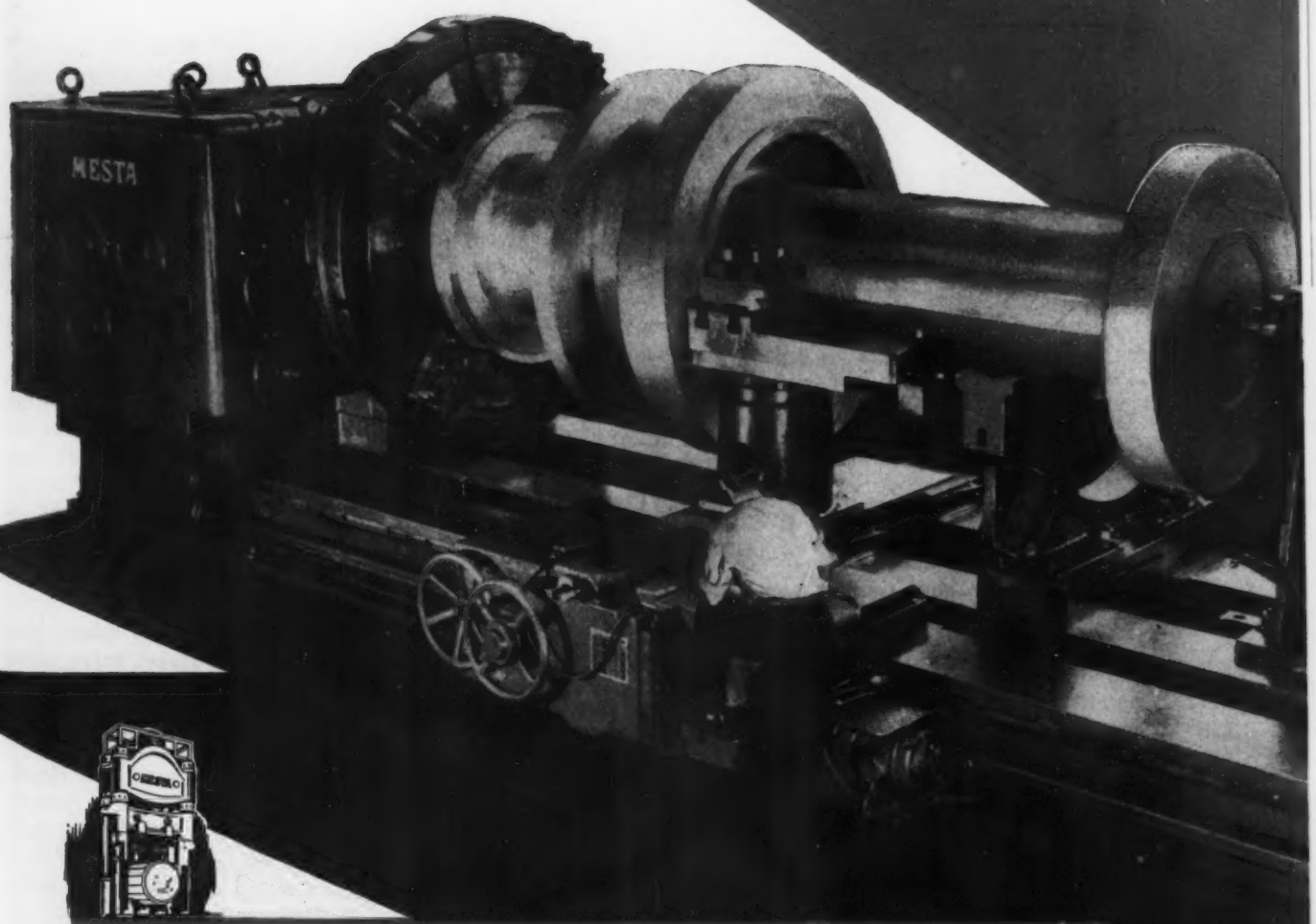
MESTA forgings

Mesta Forgings include massive crankshafts, marine parts, rotor shafts, rolls and pinions, pressure vessels, pump blocks, table rollers, and many others.

The massive rotor shaft shown, forged from ingot poured in the Mesta Open Hearth Department, is being turned for a turbine driven generator installation at one of the world's largest dams.



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MESTA MACHINE COMPANY

PITTSBURGH, PA.

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

New "face-lifted" cars must be studied in detail to determine changes required in materials and processing . . . 1950 Ford, Mercury and Pontiac are examples . . . Ford has changes.

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by Walter G. Patton

Detroit—The expression "face-lifted" model has been loosely used since the war to describe a new model car that does not embody extensive sheet metal changes. Although new body dies may not be required, it is not safe to assume that important engineering changes have not been made. Face-lift changes occasionally involve important changes in processing and materials specifications of considerable interest to the industry's suppliers. Examples are the 1950 Ford and the 1950 Pontiac which were publicly introduced this week.

Ford, Pontiac Designs Changed

It will be recalled the postwar Ford was an all new car, except for the engine. On the other hand, the postwar Pontiac was a new model which evolved from the previous Pontiac models. Changes in design of the postwar Pontiac were extensive but hardly as radical as the changes incorporated in the postwar Ford. It might be expected then that the changes being made in the 1950 Ford are considerably more extensive than the changes in the 1950 Pontiac.

It should be emphasized that car producers change their cars for several basic reasons: (1) To introduce the latest styling features; (2) to improve their ability to manufacture the car at lower cost; (3) to incorporate new engineering features, some of which at least, have been dictated by owner experience.

Some Changes Adopted in '49

Most of the changes in the 1950 Pontiac and the 1950 Ford have apparently stemmed from new manufacturing techniques or engineering advancements. In the case of the Ford, some of the manufacturing changes were adopted while 1949 models were being built.

The 1950 Ford embodies extentive changes in the engine, body, seats, frame, doors, trunk, instrument panel, brakes and floor.

A new crest appears on the front of the hood and on the center of the trunk lid. The car has a new hood ornament and a redesigned deck lid handle.

The Ford engine has a new timing gear of laminated composition which replaces the former aluminum gear.

Ford Introduces New Features

The car features new Nelson autothermic-type pistons in which a steel strut is cast into the aluminum piston to control expansion. The new pistons cannot become too tight when heated or too loose when cold. This eliminates engine slap, according to Ford engineers, and minimizes friction losses. The former Ford pistons had to be fitted with a certain amount of play to prevent cylinder scoring; the new pistons are fitted as close as 0.0005 in.

Ford has added rubber seal rings on the intake valve stem guide to prevent excessive oil consumption caused by leakage of oil past the valve guides.

The V-8 engine has a new three-blade fan, replacing the former four-blade fan. Fan speed has been reduced to 9/10th of the engine speed. Narrow fan belts are used and the drive is rearranged so that each of the two belts drives only three pulleys. The new fan operates more quietly than the former model. Other features of the Ford engine in-

This huge Tumblast is the largest batch-type blast mill made. It has a capacity of 63 cubic feet.

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for the WEST MICHIGAN STEEL FOUNDRY CO.
MUSKEGON, MICHIGAN

The high speed cleaning and large capacity of the 60" x 96" Wheelabrator Tumblast are paying rich dividends for the West Michigan Steel Foundry. It has reduced manpower requirements 60% and has effected direct cash savings of $1,491.00 each month. In addition it does a much better job of cleaning, with the result that less time is required for burning and grinding. It has reduced power consumption and has released valuable floor space for other important operations.

COMPARATIVE CLEANING COSTS
at the WEST MICHIGAN STEEL FOUNDRY CO.

Castings are cleaned three times . . . in the green stage with gates and risers attached, after annealing and for finish after grinding and welding.

FORMER METHOD	**EQUIPMENT** Three Airblast Rooms **PRODUCTION** 1297 tons per month	**LABOR REQUIREMENTS** 50 man hours daily **CLEANING COSTS** Per ton — $3.56
WHEELABRATOR METHOD	**EQUIPMENT** 60" x 96" Wheelabrator Tumblast (63 cu. ft. capacity) **PRODUCTION** 1297 tons per month	**LABOR REQUIREMENTS** 19 man hours daily **CLEANING COSTS** (including maintenance) Per ton — $2.41

WHEELABRATOR SAVINGS — Savings per ton — $1.15 Savings per month — $1,491.55
Savings per year — **$17,898.60**

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Street car axle housings (green)—500 lbs. each—8 to a load. **Miscellaneous small annealed castings**—approximately 7,000 lbs. in one load. **Fifth wheels**—in the green—200 lbs. each—6 to a load. After annealing—150 lbs. each—12 to 14 a load. **Four wheel drive transmission housings**—(green)—375 lbs. each—7 to a load. **After annealing**—240 lbs. each—9 to a load. **Squeezer work** (castings up to 50 lbs. each)—5,000 lbs. per load. **Bath tub flasks** weighing 2800 lbs. each cleaned one at a time.

New, informative book gives complete, concise information on all phases of airless blast cleaning. Write today for Catalog No. 74-A.

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WHEELABRATOR & EQUIPMENT CORP.
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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

FORD FOR 1950: From an appearance standpoint the 1950 Ford is much the same as the first postwar model introduced in June 1948. However, there have been a number of engineering changes to facilitate manufacturing and provide better passenger comfort and longer life of the car. The detailed changes are described in the accompanying paragraphs.

clude, for the first time, hardened valve seat inserts for exhaust valves; extra large oil pump and a vertical-drive distributor, incorporating full vacuum control of the ignition.

Doors are equipped with new rotary locks designed for Ford and Lincoln. The exterior handle has a push-button latch. The new deck-like lid latch has an automatic releasing support arm. The luggage compartment opens with a simple turn of the key.

More Head Room Provided

Other features include a new three-quarter horn ring; new regulators for windows; a new double-walled glove compartment door and a 25 pct increase in air flow through the heater.

Ford has also made changes in the rear axle. Eleven new body seals have been added against dust and 30 new body seals against water. There is a new front cross member of the frame. The hinges on the rear deck have been redesigned and the 1950 cars have a new rear bumper bar.

Ford is using zig-zag front seat construction on the new cars. The rear seat cushion is redesigned to provide more head room. The front brake pedal has been relocated to prevent contact with the steering column. The side members of the Ford frame are new and reinforcements have been made to give additional strength and stiffness.

The overall weight of the car has not been changed very much although some increase is evident.

Many Ford Changes Carried Over to Lincoln-Mercury Line

Many of these Ford changes have been carried over to the Lincoln-Mercury line. By relocating the heater from the passenger compartment inside the engine compartment, 30 pct more heat is provided in the passenger compartment of the Mercury.

By adding fiber glass to the asphalt impregnated felt used under the instrument panel to prevent noise, considerable quietness in operation has been achieved.

The gage of the Mercury frame steel has been increased at a number of locations to provide increased rigidity. The new pull-type hand brake is 50 pct easier to operate. The new type locks have no open edges to catch sleeves. Front doors may be locked from the outside only, using a key. The new Mercury has a redesigned ornamental deck lid handle and new bumper guards.

Speedometer, gages, the clock and radio dial are placed behind a single clear plexi-glass panel running the length of the control section. The new glove compartment is one-third larger than that of the previous model.

Cushions and seat backs of the convertible are leather and the seat facings are made of vinyl plastic.

Pontiac Changes Limited; Hydra-Matic Drive Featured

Changes in the 1950 Pontiac model follow a more limited pattern. It will be observed that some of the most extensive changes have been made to better accommodate Pontiac for Hydra-Matic drive.

Displacement of the Pontiac 8-cylinder engine has been increased to produce 108 hp. The 6-cylinder engine remains at 90 hp. Compression ratios for both engines remain at 6.5 to 1.

The new main grille bars reach out and around the fenders. The grille, itself, is heavier and is quartered by prominent support bars. Parking lamps are newly designed.

The 1950 Pontiac has a new hood ornament and a medallion. The rear deck lid handle and the rear deck nameplate are new. The lock is now mounted separately under the rear deck lid handle.

Pontiac 8 Horsepower Increased

The increase in the Pontiac 8 engine hp has been achieved by increasing the diameter of the cylinder. The crankshaft rear bearing has been enlarged and a rear bearing oil seal has been added. Outside walls of the cylinder water jacket have been moved out to provide additional cooling.

Where Syncro-mesh rather than Hydra-Matic transmission is ordered, the clutch with increased diameter is specified.

Other innovations for 1950 include larger radiator core; rubber rear spring bushings; elimination of copper wire in spark plugs; new coil and distributor cables. The steering wheel has been lowered to improve visibility for persons of less than average height. Greater body rigidity has been achieved by changing the roof rails from panel to box-type construction.

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Time to Figure on NEW ANGLES?

If structural weakness or corrosion causes early failure of angles in your machinery or equipment, consider changing to angles made of Armco Stainless Steel.

Corrosion resistance and high strength make Armco Stainless Angles logical wherever structural support is needed in corrosive service. They are ideal for equipment used in the food, chemical, oil, paper, and textile industries, and in similar applications.

Armco Stainless Steel Angles are available for immediate delivery. Write us or call your nearest Armco Distributor. Angle-sizes listed on this page are available in Armco Stainless Steel Types 304 and 316.

Remember too, your Armco Distributor can give you helpful metallurgical assistance and quick delivery of Armco Stainless Steel sheets and bars in all standard types. He can also supply special grades on short notice.

Write us if you are not acquainted with the Armco Distributor in your territory. We're sure you will profit by knowing him. Armco Steel Corporation, 3479 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

Stock Sizes of Armco Stainless Steel Angles

3/4" x 3/4" x 1/8"
3/4" x 3/4" x 3/16"
3/4" x 3/4" x 1/4"

1" x 1" x 1/8"
1" x 1" x 3/16"
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WEST COAST PROGRESS REPORT

Despite loss of about 360,000 tons of steel, sales managers can't afford complacency . . . K-F readies first auto plant.

Digest of Far West Industrial Activity

by J. J. Reinhardt

Los Angeles—Even though the West lost approximately 360,000 net tons of steel during the 42-day-long strike and there is a genuine shortage of some items, steel salesmen—with one notable exception—are not on vacation.

Sales executives have no axiety about full booking for the rest of this year on products produced in the West but already there are indications that there are quite a few openings on many mills for the first quarter of 1950. A survey of buyers indicates that sheets of all grades and tinplate will remain tight at least for the first two quarters of 1950 and perhaps longer, while demand for structurals and bars is definitely softening.

German, Belgium Steel Offered

Offerings of German and Belgium steel on the Coast at competitive prices or better are not making the lot of sales managers of western producers any easier.

All primary producers on the Coast are working both furnaces and mills at capacity or very close to it at present but what will happen at the end of the next 2 months for some of the smaller independents is questionable.

Columbia Steel Co. at Torrance is already in full production with its old hand sheet mills working 20 turns per week, producing black and galvanized.

Bethlehem Pacific Coast Steel Corp. here is likewise in full production.

Plate Production Pushed

Kaiser Steel Corp. at Fontana, which was not closed down at any time during the strike, continues at well above rated capacity of its openhearths and with its plate mill operating 15 turns per week to supply material for its pipeline contracts through Consolidated Western Steel Corp., and Kaiser Basalt at Napa, Calif. Although the closure of Consolidated during the strike permitted Kaiser to stockpile plates on that contract at the rate of approximately 20,000 tons per month, it will be necessary to push production on the plate mill to meet the demands of these two large pipe fabricators.

Kaiser Steel Corp. earlier this month announced delivery of a trainload of line pipe manufactured by Basalt Rock Co. from plate rolled at Kaiser's Fontana plant.

This 60-car train was only a part of a large order of steel pipe destined for Texas Eastern Transmission Corp. of Shreveport, La. This load of 20-in. pipe will stretch 9½ miles through eastern Texas and Louisiana, which is a small part of the line which will carry gas from Texas to New York City, a distance of 1840 miles.

Blast Furnace Output Questioned

There has been some conjecture and question as to the productivity of the second blast furnace at Kaiser Steel Corp., which was recently blown in. Trade rumor had it that this new stack was turning out only about 600 tons of iron per day. The facts are that the furnace was rapidly pushed to a production of approximately 1000 tons per day, which rate was maintained until recently when blast was reduced primarily for operational reasons. It is expected that by the end of this week production will again be back to about 1000 tons per day and that within a week or 10 days full capacity of 1200 tons per day will have been reached.

Whatever the actual production

Your best bet... Macwhyte ATLAS Braided Wire Rope Slings

No other braided sling has this combination of construction features
1. ATLAS Slings are braided from right lay and left lay endless rope.
2. In ATLAS Slings the left lay ropes are braided to the right, and the right lay ropes are braided to the left.
3. All ropes in ATLAS Slings follow a continuous spiral path throughout the entire body length.
ATLAS Slings have greater resistance to kinking
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ATLAS Slings... particularly designed for your particular lifting needs

Ask Macwhyte to recommend the right sling for your every lifting need

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of the two blast furnaces has been, it is reasonable to believe that the above explanation is accurate since there is no indication that there has been a shortage of basic iron for Fontana's openhearths. Between Oct. 15 and Oct. 20, 2766 tons of foundry iron were produced and between Nov. 5 and Nov. 17, 8881 tons of foundry iron were produced. Operating practice at Fontana at present involves hot iron charges of between 50 and 60 pct.

Coking Coal Reserves Enlarged

Kaiser last week announced that holdings of coking coal had been enlarged by the leasing of an additional 600 acres of reserve in central Utah. This latest acquisition brings the total new coal deposits under lease to 3640 acres which is a supply estimated to exceed 36 million tons. It is further estimated that the total reserves now under lease will supply sufficient coal for coke at its Fontana blast furnaces for more than 40 years at full capacity. Kaiser has also recently arranged for shipments of relatively low volatile coal from Raton, N. M., at favorable freight rates over the Santa Fe Ry., which may considerably reduce imports from Oklahoma. This New Mexico coal has been extensively and successfully used by Colorado Fuel & Iron Corp.

Geneva Steel Co. in Utah expect to be back at prestrike levels of production early this week, which means that 3 of the 4 batteries of coke ovens, 2 of 3 blast furnaces at Geneva; 2 batteries of coke ovens and the blast furnace at Ironton; 6 of 9 openhearths and the plate mill at Geneva will be in production.

Mining of coal for both the Geneva and Ironton coking ovens is continuing on an "as needed" basis. The structural mill at Geneva which has been down for several months is expected to go back into limited production in about 3 weeks for an indefinite time.

Develops Small Assembly Plants

Los Angeles—Although production of Kaiser and Frazer automobiles has been temporarily suspended at Willow Run, the corporation is continuing its development of the assembly plant at Long Beach which is to be the prototype of a number of small plants throughout the United States designed to assemble about 20 units per day with a payroll of about 100 men.

The Long Beach plant is housed in a part of the Douglas Aircraft buildings which were leased several years ago by Kaiser-Frazer and which until recently were used only for incidental storage.

Since it was announced several months ago that K-F intended to spot such small assembly plants throughout the United States, the Long Beach facility has been readied as a testing ground. So far only a few cars have been assembled each day with a labor force of approximately 50 men while operational methods were worked out and costs determined.

In Portland, the Union Pacific R. R. has begun construction of a plant to be leased to Kaiser-Frazer for a similar operation.

Steel Operations Televised

Los Angeles—For what is believed to be the first time, molten steel and roaring blooming mills were the featured characters on television when station KTLA, Paramount Television, took its cameras into the Los Angeles plant of Bethlehem Pacific Coast Steel Corp.

This station is broadcasting a weekly program titled "City at Night" between 9 o'clock and 11 o'clock designed to show stay-at-homes what goes on behind the scenes while a large portion of the population relaxes. Keith Heatherington and Dorothy Gardner of KTLA elicited from Bethlehem local public relations man Fred Steifler explanations of the tapping, pouring and rolling operations which were only moderately distorted on local televison screens by the voltage surges developed by the arcing in the plant's electric furnace.

SCRAP IRON: Scrap steel is salvaged from this dump by The Minnequa Salvage Co., Pueblo, which has a contract with Colorado Fuel & Iron Corp. to work two huge dumps in which steel and iron are mixed with slag and other refuse. The dumps are 4 miles long, 70 ft high, and a block wide at the top. Use is made of four International TD-18 diesel crawler tractors in the salvage operations.

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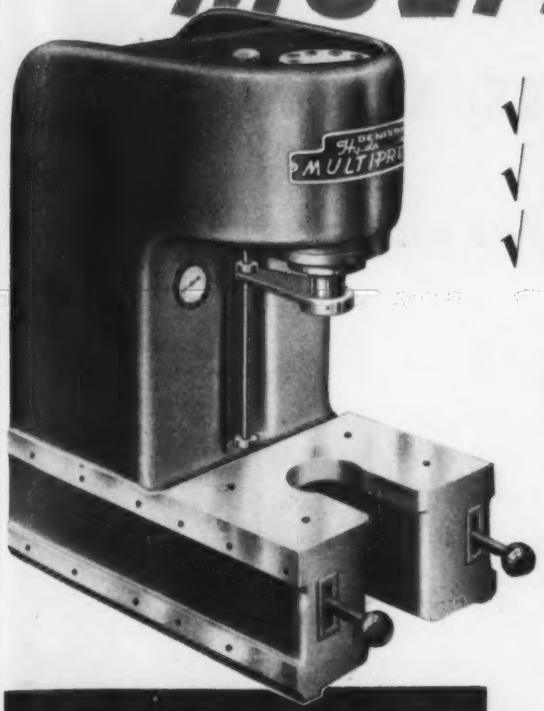

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Eliminating trapped air, improving metal flow conditions, eliminating laminating in parts formed of loose material, sharper detail on coined or embossed parts are only a few of the many advantages gained through use of Denison exclusive Vibratory HydrOILic Pressure.

Tonnage is reduced considerably on many jobs. Tests have proved conclusively that when vibratory strokes are used not only is less pressure needed—sharper definition is obtained through better metal flow.

All this adds up to lower costs for your operation. This new principle may be the answer to any number of your production problems. Why not take advantage of our test lab facilities to check your job—with vibratory repeat strokes. Write for full information.

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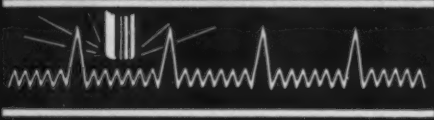
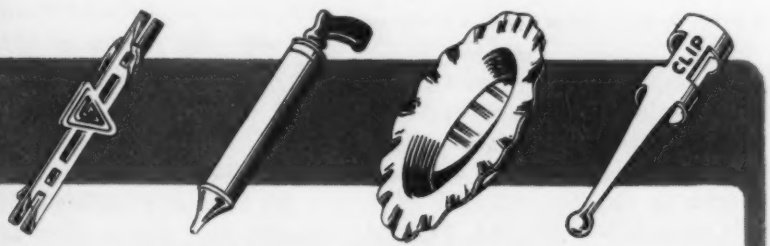


Uniform repeat strokes regulative in number, length and tonnage may be accurately controlled for a variety of operations. The ram will descend, make short repeat strokes and cycle either automatically, or by manual lever control. Adjustments include length of stroke from a few thousandths to ½ inch, tonnage from a few hundred pounds to maximum of press, and speed frequency that is regulative through a stepless range.



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Using progressive dies with vibratory ram action brings cleaner-cut swedging of caulking-gun nozzles.

Vibratory action removes drawing wrinkles from silver dishes far better than old hammer-and-block method.

6-ton vibratory repeat strokes form and mark pencil clips better than 25 tons by previous method, user reports.

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Please send further details on vibratory repeat stroke features.

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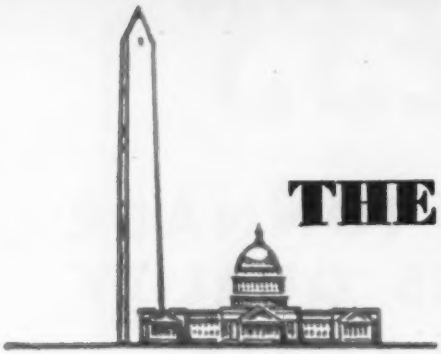


THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

Celler, House Monopoly Committee head, hits big business again . . . Says something must be done about size in and of itself . . . FRB lending plan would clip RFC's wings

by Eugene J. Hardy

Washington—For many weeks Washington observers have been waiting for a hint of possible legislative remedies from the prolonged hearings of the House Judiciary Monopoly subcommittee. Last week, Chairman Celler, Dem., N. Y., let the first suggestion drop.

Views Reflect New Deal Thinking

Continuing his attacks on "big" business, Mr. Celler stated that from testimony and facts gathered thus far it was his opinion that "something must be done with reference to size in and of itself." His remedy: Give the Federal Trade Commission or some other administrative agency power to determine how large a business could become and further power to order the dissolution of companies that became too large. He also plumped for enactment of the House-passed bill which would bar the acquisition of physical assets of one firm by another if the effect was to substantially lessen competition. In this perennial measure, the Federal Trade Commission would also be the determining agency.

Mr. Celler's suggested remedies are of particular significance since they reflect the extreme New Deal thinking on this subject of Corwin Edwards, chief FTC economist, as well as those of David Cushman Coyle, who is directing the staff efforts of the Monopoly subcommittee.

Mr. Coyle is reported to be in line for the remaining vacancy on the five-man Federal Trade Commission. The interest of these men in pushing for further power for FTC needs no elaborate explanation.

FTC Might Advise

Mr. Celler's informal opinion would call for a thorough economic study of any company suspected of being too big. Then, if this company wanted to purchase or merge another company, Mr. Celler suggests that perhaps it should be that "that corporation has the burden of proving to an administrative agency that the acquisition would be in the public interest, would make for greater efficiency, would make for greater economy in production and management, would mean prevention of monopoly or so-called oligopoly, would guarantee competition, and would preclude the administered price."

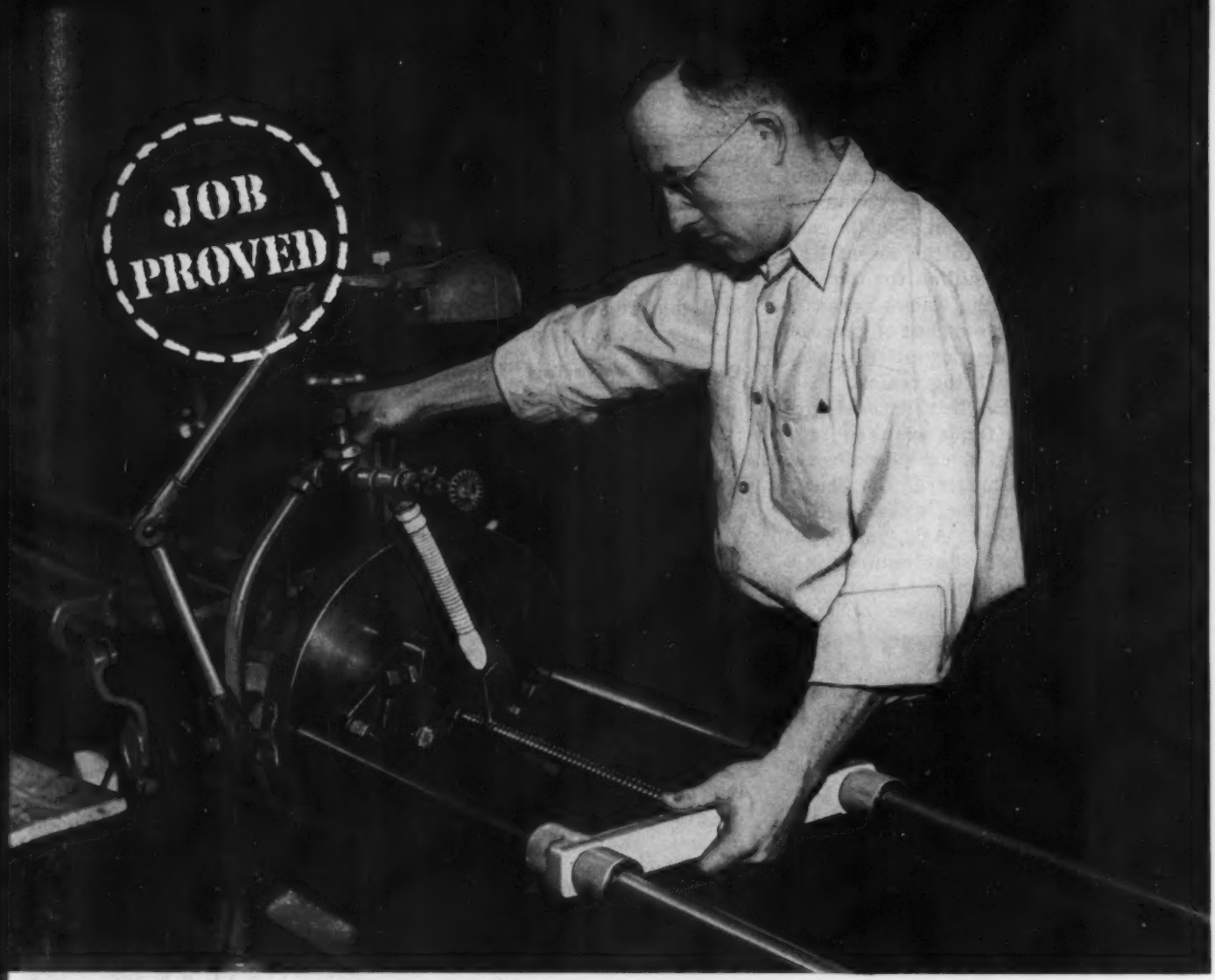
Under such a proposal, the Federal Trade Commission would be permitted to give advisory opinions to corporations. Final decisions, says Mr. Celler, would be subject to judicial review.

Mr. Celler admits that "there might have to be a period of grace, as far as large corporations are concerned, that have grown too large in the opinion of the administrative agency." During this period, he would permit them to "unwind or unmerge, like the requirements on the Public Utility Holding Requirement Act."

The New York Congressman says that the above "is a sort of bird's eye view of what seems to be formulating" in his mind as a result of the hearings thus far. Should he embody these ideas in a piece of legislation, which seems likely, the public will witness a Congressional fight the like of which hasn't been seen for many years.

Rumor Is Kaiser Will Get No More "Speculative" Loans

Henry J. Kaiser will get no additional government funds for new "speculative ventures," according to word that has been



TOOL LIFE INCREASED 25%

Sunicut Improves Broaching Finishes, Operators Like Its Transparency

A plant manufacturing valves was using an expensive straight animal oil for broaching. They were also adding large amounts of this product to the cutting oil used in most other machining jobs. Naturally, cutting oil costs were high.

On the advice of a Sun Engineer who had been called in, the company tried Sunicut. Good finishes resulted in all operations, completely eliminating the need for straight animal oil. Tool life increased 25 percent. Operators liked Sunicut for its transparency—it kept work visible all the time. The plant has been using Sunicut for 14 years with complete satisfaction. Two years ago, the company switched to Sunicut with Petrofac, and since then results have been even better.

Wherever operations involve tough cutting, tapping, or threading, the new grades of "Job Proved" Sunicut with Petrofac will give smooth, accurate finishes. The new grades of Sunicut possess superior metal-wetting, antiweld, and extreme pressure characteristics. They do not contain any animal or vegetable fatty oils—therefore cannot turn rancid.

For information about either Sunicut or the famous Sunoco Emulsifying Cutting Oil, call or write your nearest Sun Office.

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passed around Washington as coming from the high command of the Democratic party. Some unfavorable reaction, public and Congressional, to the recent RFC loan of $44.4 million for the purpose of enabling Kaiser-Frazer to expand its present line of cars and bring out a new low-priced model, is advanced as the reason.

Not only has this dispensing of government funds resulted in a Congressional investigation by the RFC subcommittee of the Senate Baking Committee, headed by Sen. Fulbright, Dem., Ark., but it has touched off a host of inquiries into the general policies of government lending.

The size and purpose of the recent RFC advance to Kaiser caused some lifting of eyebrows. Critics charged that for all practical purposes, the loan put the government into the position of providing equity financing. Congress has gone on record many times as opposing RFC's entry into the equity financing field. This is evidenced by the fact that RFC loans were limited to a 10-year period on the basis that longer loans were in fact equity capital. But RFC legislation, as amended by the 80th Congress, is so general that funds can be advanced for almost any purpose.

Sees RFC Violating "Intent"

Sen. Fulbright believes that RFC has gone outside the limits of Congressional intent in granting this loan to finance a new line of cars and more important to introduce a new model in competition with the "Big Three" at a time when competition is fast returning to this fiercely competitive industry. Further it is felt in some quarters that RFC went far beyond its generally understood mission of bailing out industries in difficult straits. RFC defends the loan as being within legislative limits and further on the grounds that in the automobile business, Kaiser-Frazer is still "small business."

Regardless of the merits of either side of this argument, it would appear that the federal government has embarked on a course of financing speculative ventures in direct competition with established firms in a manner that is reminiscent of the Fair Deal Planners who are backing the "Economic Expansion Act," which would give the government the power to make any kind of business loan and to go into business itself.

Of the total amount advanced to K-F, $22 million is for expansion of the present line of cars and $4.4 million is for engineering, tooling, etc., of the new low-priced car. There is some doubt here that this latter amount will be sufficient to do the job and a feeling that K-F will be back for more. Should this transpire, additional funds might well be advanced, since it is understood that the unofficial ban is on loans for new ventures only.

THE BULL OF THE WOODS — By J. R. Williams

GET ME TH' GATEHOUSE ON TH' PHONE--I'VE GOT A CROW TO PICK WITH THAT BLASTED WATCHMAN!
HE'LL JUMP ON TH' WATCHMAN FOR LETTIN' HER IN TO GET AT HIM, 'CAUSE HE FELL FOR IT, TOO, AND HAS LET HER GO AROUND NICKIN' TH' BOYS FOR SOME CHARITY STUFF!
I GUESS SHE KNOWS IF YOU CAN BREAK THROUGH HIS GUARDS YOU FIND TH' BIG BOY AS SAPPY AS TH' REST OF US!
11-25 J.R.WILLIAMS
THE BREAKDOWN
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Reserve Board Plan Would Really Clip RFC's Wings

On the overall subject of government lending, the Federal Reserve Board has come up with a plan that would clip the RFC's wings for fair. Under this proposal, the federal government's activities in the field of banking and finance would be broadened to an unprecedented degree.

Thomas B. McCabe, chairman of the board of governors of the Federal Reserve System, disclosed details of a new projected aid-to-small-business financing program in a recent memorandum to a Joint Economic subcommittee studying government credit policies.

But the Reconstruction Finance Corp., foreseeing a decline in its functions and importance if Congress accepts the McCabe proposal, is doing its level best to retain its No. 1 position as a federal lending agency.

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IRON AGE
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FEATURE ARTICLE

Air-Hardening Tool and Die Steels

CHARACTERISTICS and CLASSIFICATION

By C. B. POST
Metallurgist,
Carpenter Steel Co.,
Reading, Pa.

SUMMARY: Air-hardening tool and die steels offer greater freedom from cracking especially in intricate sections, less distortion in heat treatment, a minimum of size change, and uniform through-hardening. In this first part of a three part article, the author discusses the general characteristics of these steels and separates them into three classifications based on analysis and usage. The mechanics of air hardening are also outlined.

MANY tool and die applications are taken care of by water-hardening and oil-hardening grades of tool steels. Water-hardening straight carbon steels are the oldest grades, and at one time had the widest distribution, but as time went on, it became apparent that water-hardening, high carbon tool steels were not the answer to all tool and die problems. This was because of the limitations they imposed on tools due to distortion and size change in heat treatment, and also because of cracking tendencies in heat treatment of intricate sections.

Development of oil-hardening nondeforming tool steels solved many toolmaking problems because of their relatively low distortion, size change, and freedom from cracking during heat treatment as compared to the water hardening grades.

Every tool steel imposes definite limitations on the design and shapes of tools which can be made from it. Among these are size change and distortion limitations of the steel when quenched to make the tool and limitations on the size of sections in the tool which can be successfully hardened from the steel. Toolmakers are continually faced with the demand for tools which involve either an extremely intricate design, or a section so unbalanced that even the oil harden-

ing grades of steel will not produce satisfactory results. Tool designers are therefore constantly searching for steels which will allow more latitude in the design and size of tools, particularly where the demand emphasizes extreme accuracy in hardening with a minimum of finish grinding and lapping.

This trend in toolmaking, to demand greater accuracy in hardening with greater freedom from cracking during hardening in intricate sections, accounts for the gain in popularity and use of air-hardening steels as compared to oil-hardening grades for these specialized applications. There is also the application of air-hardening tool steels to making large tools which cannot be satisfactorily hardened from oil-hardening steels because of hardenability considerations and limitations on oil-quenching equipment in handling large and heavy tools.

The toolmaker will reconsider use of an oil hardening steel and will consider an air hardening tool steel when one or more of the following conditions must be met:

(1) The steel must have less distortion in heat treatment than can be obtained with the conventional oil-hardening steels.

(2) The proposed tool will have extremely intricate sections involving both thin and heavy sections where less cracking hazard and minimum size change and distortion are desired after heat treatment.

(3) The steel to make the tool must harden through uniformly in large sections, and if not through-hardening, extremely deep hardening, which could not be obtained with the oil hardening grades.

(4) The size of the tool is too large for the oil quenching equipment available, and the simple procedure of air quenching is the logical answer.

The grades of air hardening tool and die steels discussed in this article will include only those capable of reaching a hardness of at least 60Rc when air cooled in reasonable-sized sections such as a 4 in. square. Alloy steels of the SAE 3330 to 3350 class, and variations of these chrome-nickel alloy steels containing small amounts of molybdenum, tungsten, and other potent carbide formers will not be considered, because they are generally incapable of reaching a hardness of 60 Rc as air quenched. This article will not include such types of deep oil hardening steels which will air harden in sizes of 1 in. round or less.

Available air hardening tool steels can be divided into two main classes according to the heat treatment necessary for hardening:

(1) High temperature steels, which contain sufficient amounts of alloying elements to have a secondary hardness tempering range and harden from about 1750° to 1900°F. The most common grades of this type are those steels depending upon either high chromium content for their secondary hardening power, or upon lower chromium (about 5 pct) together with molybdenum or tungsten contents.

(2) The low temperature group, often referred to as the manganese-chrome-molybdenum group. These steels are a more recent development than the high temperature types and are characterized by from 0.70 to 1.00 pct C, 2 to about 3 pct Mn, ½ to about 2 pct Cr and 1 to 2 pct Mo. There are several variations of the manganese-chromium-molybdenum analysis as follows: (A) 0.70 pct C, 2 pct Mn, 1 pct Cr and 1 pct Mo, (B) 1 pct C, 2 pct Mn, 1 pct Cr, 1 pct Mo, (C) 1 pct C, 3 pct Mn, 1 pct Cr, 1 pct Mo, and (D) 1 pct C, 2 pct Mn, 1.90 pct Cr, 2 pct Mo. All of these steels are characterized by their capacity to harden from temperatures of approximately 1500° to 1600° F. The 0.70 pct C steel is an exceptionally deep hardening steel, and with its lower carbon content is considerably tougher than the 1 pct C grades.

Heat Treating Characteristics

In the high temperature class is found the 1 pct C — 5 pct Cr — 1 pct Mo grade of air hardening steel which has won fairly wide acceptance for general purpose use. This grade of steel is hardened at from 1725° to 1775°F. Packs using cast iron borings, neutral salt baths and protective atmosphere furnaces can be used for this hardening operation. A hardness of Rc 63 to 65 can be obtained on air cooling in sizes up to 3 in. round by 3 in. long, Rc 62 to 64 in sizes up to 4 in. round by 4 in. long, and Rc 60 in the larger sizes up to about 6 in. round by 6 in. long. In sizes of 10 in. round by 10 in. long the hardness will be about 54 Rc. A hardness of about 60 to 62 Rc is obtained after drawing at 400° F for 1 hr when the air-cooled hardness is Rc 63 to 64.

The 1 pct C — 5 pct Cr — 1 pct Mo steel is a fairly deep air hardening steel. It has the advantages associated with all air hardening steels in that its size change and distortion are slight on heat treatment. The main disadvantage of this steel is the high alloy content, particularly chromium and molybdenum, which requires that the steel be heat treated from a high temperature, and also requires that the steel be forged in the same manner as high speed steel.

In the high temperature class of air hardening steels, the steel with 1.50 pct C, 12.50 pct Cr and small amounts of vanadium and molybdenum has found favor as the wear-resisting or "air-wear" member of the air hardening tool steels. This grade of steel must be hardened from a temperature of 1825° to 1875°F. It is an exceptionally deep hardening grade of steel, hardening to about Rc 63 to 65 in sizes up to 4 in. round by

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4 in. long, Rc 60 to 62 in sizes up to 6 in. round by 6 in. long, and up to about Rc 58 in sizes up to 10 in. round by 10 in. long. With a hardness of Rc 63 as quenched, this steel will show a hardness of about Rc 59 to 61 after drawing at 450°F. It has the advantages of low distortion and size change associated with air hardening steels. The main disadvantage is the high alloy content which requires high treating temperatures and pack hardening, protective atmosphere furnaces, or neutral salt baths. The high alloy content makes the steel relatively difficult to hot work and forge, and requires specialized techniques in forging and cooling practice similar to those used for high speed steel.

Both the 1 pct C — 5 pct Cr — 1 pct Mo and the 1.50 pct C, 12 pct Cr air hardening steels are sensitive to the retention of large amounts of austenite if overheated in hardening. This is not too great a disadvantage and can be overcome and controlled if the temperature inside the hardening pack is known, or if the neutral salt bath or protective atmosphere furnace are carefully controlled for temperature. The use of subzero treatments can frequently salvage a tool which has been overheated during hardening.

The low temperature group of steels can be discussed from the standpoint of the 1 pct C, 2 pct Mn, 1 pct Cr, 1 pct Mo steel, and the 0.70 pct C, 2 pct Mn, 1 pct Cr, 1 pct Mo grades. In the case of the 1 pct C grade, air hardening from temperatures of 1550° to 1600°F will produce hardness of Rc 63 to 65 in sizes up to about

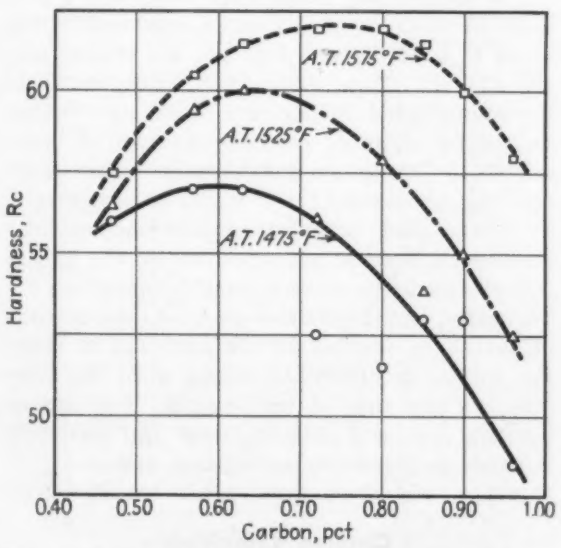
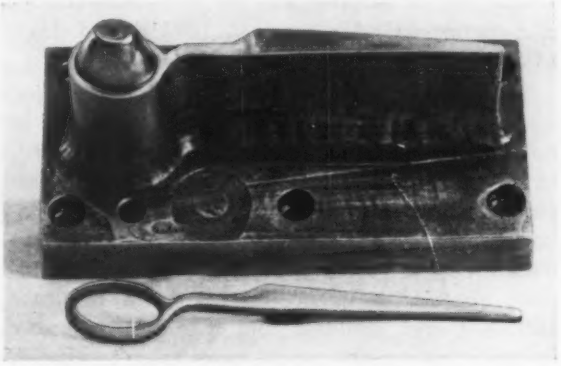


FIG. 1—Effect of carbon and austenitizing temperature on hardness penetration (at center of 4 in. diam by 4 in. long specimens) of air hardening steel, 2 pct Mn, 1 pct Cr, 1 pct Mo type.

2 in. round by 2 in. long; this hardness will drop rapidly for larger sizes. For sizes of about 3 in. round by 3 in. long the hardness as air-cooled will be about Rc 60, and about Rc 54 in a 4-in. round by 4-in. long section. Increasing the manganese for deeper hardenability in these 1 pct C grades will result in high percentages of austenite being retained, and may lead to cracking difficulties on hardening. By and large, the 1 pct C, manganese-chromium-molybdenum steels have not found much application as air hardening tool steels except in small sizes, where standard grades of oil hardening nondeforming tool steel can be successfully used.

It was found that the carbon range of 0.60 to 0.80 pct, together with about 2 pct Mn, 1 pct Cr and 1.25 pct Mo leads to an exceptionally deep air-hardening steel when hardened in the temperature range of 1500° to 1550°F.[1]



A punch for producing scissor blades. Air-Tough steel reduced breakage and gave production of about 500,000 blades per die.

Fig. 1 shows graphically the affect of carbon on the resulting air-hardening of steels containing about 2 pct Mn, 1 pct Cr and 1.25 pct Mo in 4 in. round by 4 in. long sections. The nature of the critical carbon range is clearly seen in the figure. The 0.60 to 0.80 pct C range, coupled with the low alloy content of 2 pct Mn, 1 pct Cr and 1.25 pct Mo leads to a steel which has superior impact resistance to shock when compared to the 1 pct C — 5 pct Cr — 1 pct Mo and the 1.50 pct C — 12 pct Cr types of air hardening steels, thus placing this grade of steel in the "air-tough" class. This steel is not as tough on impact as it might be if the carbon were lowered to 0.50 pct,[2] but the applications requiring an air hardening steel which will develop a hardness of Rc 56 as air-cooled are exceptional.

The low alloy content of the 0.60 to 0.80 pct C manganese-chromium-molybdenum steel also leads to ease in forging large and intricate sections. The steel is much easier to handle in hot rolling or forging than the 1 pct C, 5 pct Cr, and 1.50 pct Mo steels, and since substantially the same hardness is developed in the two grades on air cooling, it is advisable in many instances to use this steel rather than the higher carbon grades.

Air hardening steels currently available may be separated into three principal classifications based on analysis and usage:

(1) Air-Wear; 1.50 pct C, 12 pct Cr, 1 pct V,

for use where considerable wear resistance is desired. Pack harden at 1825° to 1875°F; draw at 450° to 700°F for resultant hardnesses of Rc 59 to 60 or Rc 55 to 56.

(2) Air-Hard; 1 pct C, 5 pct Cr, 1.50 pct Mo, for general use. Pack harden at 1725° to 1775°F; draw at from 400° to 700°F for hardnesses of Rc 60 to 62 or Rc 57 to 59.

(3) Air-Tough; 0.70 pct C, 2 pct Mn, 1 pct Cr, 1.25 pct Mo, for greater resistance to impact shock, ease of forging, and minimum size-change and distortion. Air treat at 1500°F and draw at 350°F for final hardness of Rc 58 to 60.

This matched set of air hardening tool and die steels possesses the following advantages in toolmaking over conventional oil and water hardening steels: Simpler heat treatment as compared to water and oil quenching types; relatively slight distortion; absence of thermal gradients during air-cooling, resulting in almost complete absence of quenching cracks in intricate sections; and hardness and ease of hardening in large tools which would be difficult to quench in oil.

Mechanics of Air Hardening

Air cooling of regularly shaped masses is a relatively simple process compared to the complex physical phenomena encountered at the metal-coolant interface in water or oil quenching. When a regularly shaped mass of steel is cooled in air, the factor which determines the rate of cooling is radiation of heat from the surface, not the conduction of heat as in water or oil quenching. Furthermore, from the manner in which air cooling takes place, the thermal diffusivity of heat in the metal is as great as the loss due to radiation, because the air cooling rates of surface and center of large masses of steel are substantially equal.

Fig. 2 shows surface and center cooling curves for a 6-in. round by 6-in. long piece of 30 pct Ni steel.[3] This nickel steel has the same thermal diffusivity as austenite. The thermocouple on the surface was about ⅛ in. below the surface of the round, and the other thermocouple was at the center of the specimen. Note that, in the early stages of cooling, the surface temperature drops rapidly to about 160°F below that of the center. As cooling continues, rates of cooling of the surface and center are substantially equal, especially in the important ranges where hardening takes place.

This equality of surface and center cooling rates means that the hardness of air cooled regularly-shaped tools will be uniform from surface to center. This is not always true if high chromium content leads to high carbide segregations in the center of the tool, or if fins or other relatively thin sections are present compared to the main body of the tool.

Another fact associated with the mechanics of air cooling is that the center and surface cooling rates of a regularly-shaped mass of steel depend only on the surface per unit volume of the mass. In fig. 3 is shown the center cooling velocity in degrees Fahrenheit per minute through the range of 1300°F to 1000°F for rounds and rectangular shapes air cooled from temperatures of 1600° to 1900°F.

The data in fig. 3 shows that:[3]

(1) Heat treating temperature has no effect on rate of cooling past 1300° to 1000°F. The rate of cooling through this temperature range is generally taken as the parameter which determines the resulting hardness of the steel.

(2) If the surface per unit volume of the tool is known, the cooling rate of the specimen can be predicted with reasonable accuracy from fig. 3.

Air hardening steels can be rated in terms of the hardness they will develop with various cooling rates, and a knowledge of the *surface per unit volume* of a part made from the steel will enable the cooling rate past 1300° or 1000°F to be read from fig. 3. Knowing the cooling rate of the part in question and the hardness which the steel willl develop on air cooling with this velocity, the tool designer can determine the approximate hardness to be expected in the finished tool.

The air-treating temperature will have a pronounced affect on the hardness developed in the 1 pct C, 5 pct Cr and 1.50 pct Mo grades, and the 1.50 pct C and 12.50 pct Cr grades of air hardening steels. These two steels are characterized by sluggish reacting carbides of chromium or chromium-molybdenum. Any heat treating temperature represents a compromise with time and temperature relationships concerning the amount of carbon which will diffuse into the austenite at any given temperature for a specified period of time. As such, the amount of carbon in solution in the austenite in these two grades is highly dependent upon the temperature and time at temperature. For higher temperatures and longer times the austenite is richer in chromium and carbon, and as a consequence, will show greater air hardenability.

Cooling Velocities

Thus, in the case of air hardening steels, higher treating temperatures will lead to greater hardenability, not because of any affect of temperature upon the subsequent rate of cooling through the critical temperaturue range of 1000° to 1300°F, but because of the change in alloy content of the austenite with increase in temperature.

Jigs and fixtures used in quenching air hard-

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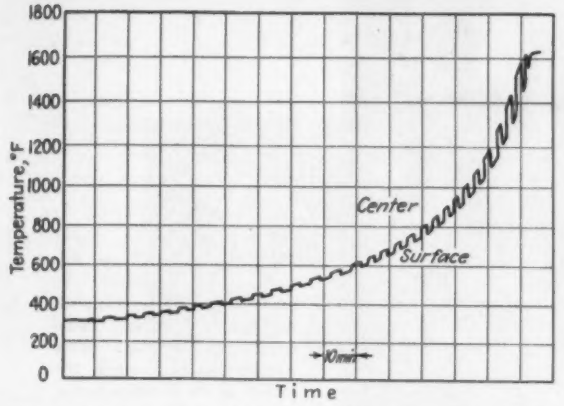

FIG. 2—Center and surface air-cooling curves of a 6 in. round by 6 in. long cylinder of 32 pct Ni steel.

ening steels are comparatively simple, and are designed only to insure the absence of dead air space around the tool to be hardened. In general, it is only necessary to have the work supported off the floor by means of a screen or a few points of support. It is desirable that the tool have enough clearance between itself and the floor to obtain free circulation of air on all sides. Under no condition should the work be laid directly on the floor during air cooling, as this will result in uneven hardening and possible distortion.

In some intricate massive sections it may be necessary to keep the air moving freely by means of fans, and in this case some care should be taken to see that the air moves symmetrically about the tool during hardening. A blast should not be directed on one side of the tool and it is well to avoid the use of a heavy blast entirely. It is only necessary that the air be kept moving freely, especially through open holes, and this can be accomplished by placing one or more fans far enough away from the work piece to give a gentle cooling action.

In hardening from a neutral salt bath, the work piece will generally be wired to a supporting bar for ease of handling in and out of the salt bath. After preheating over the salt bath or in an auxiliary salt bath or furnace, the work piece is then fully heated in the salt bath, and can be suspended in air for cooling. Careful consideration should be given to the manner in which the work piece is wired to the support bar so that warpage during heating and cooling cycles is avoided.

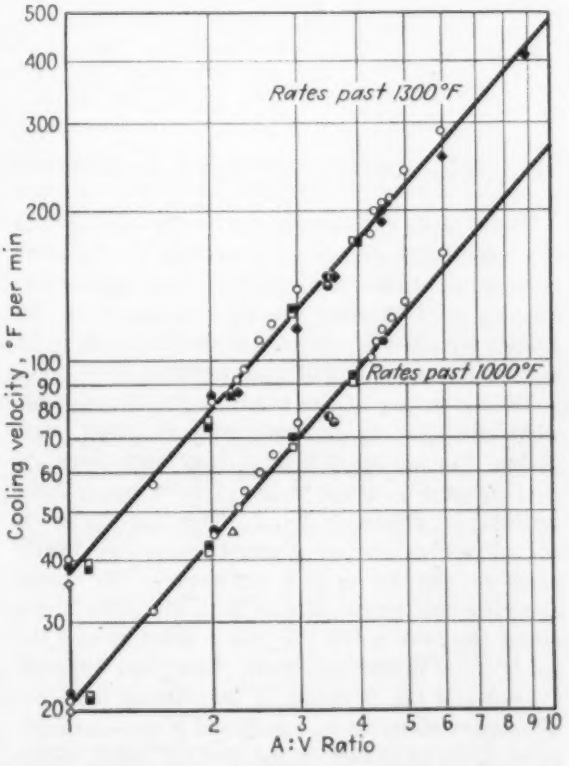

FIG. 3—Center cooling velocity through the range of 1300° to 1000°F on steels air cooled from 1600° and 1900°F. All symbols indicate rounds, except small squares, which represent rectangular specimens. (A complete definition of symbols is given in Table I.)

TABLE I

Explanation of Symbols in Fig. 3

Shape	Cooled From	Kind of Steel
○ Rounds	1600° F	30 pct Ni
● Rounds	1900° F	30 pct Ni
□ Rectangular	1600° F	30 pct Ni
■ Rectangular	1900° F	30 pct Ni
△ Rounds	1600° F	1.0 pct C, 5.0 pct Cr
▲ Rounds	1900° F	1.0 pct C, 5.0 pct Cr
◖ Rounds	1600° F	0.40 pct C, 5.0 pct Cr
◒ Rounds	1900° F	0.40 pct C, 5.0 pct Cr
♦ Rounds	1600° F	0.70 pct C, 2.0 pct Mn, 1.0 pct Cr, 1.0 pct Mo
◆ Rounds	1600° F	0.89 pct C (French)

An air hardening steel is capable of giving much less distortion on hardening than the water-hardening or oil-hardening grades of tool steels. To take advantage of this low distortion on hardening, all tools should be given a stress relief at 1200°F before the final light machine cuts or grinding operations prior to hardening. This is standard practice in precision tool making and heat treating, and is an operation that cannot be safely eliminated if the best results are to be obtained on subsequent heat treatment.

The second part of this article will deal with internal stresses due to water, oil, and air hardening, with sections on distortion during hardening and size change and hardenability of air-hardening steels. Part II will appear in the next issue.—Ed.

References

[1] U. S. Patent 2,355,224, G. V. Luerssen and C. B. Post (The Carpenter Steel Co.)

[2] U. S. Patent 2,379,988, C. B. Post and M. C. Fetzer (The Carpenter Steel Co.)

[3] "Air Hardenability of Steels," Post, Fetzer and Fenstermacher (The Carpenter Steel Co.), ASM Transactions.

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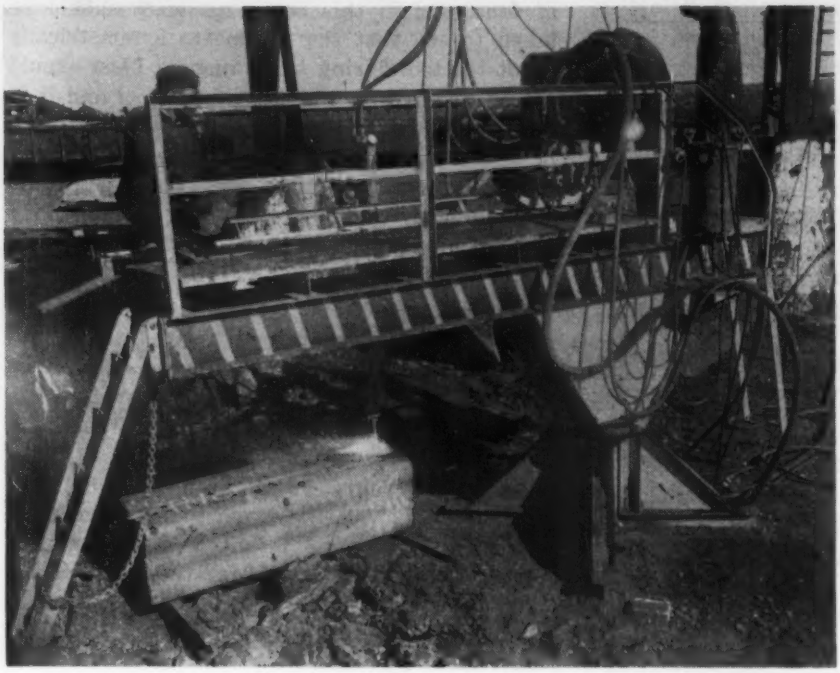


FIG. 1—Mounted on this beam and pedestal, the torch is portable, requires no special coolant, operates in a complete circle about the base while the motor drive permits radial adjustment.

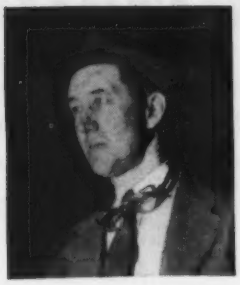
Powder Cutting Buttons and Skulls

A TORCH to cut through steel up to 60 in. thick has been needed for some time. In the past few years considerable effort has been put into such a development through the cooperation of various steel plants and the Linde Air Products Co., evolving in the C-60 powder cutting torch. On Mar. 3, 1949, Colorado Fuel & Iron Co., put into operation one of these torches to properly size an accumulation of large chunks of steel for charging into openhearth furnaces. At the time the torch was installed, there were about 500 tons of this heavy scrap in the skull cracker and the slag yard of the plant.

The accumulation of this heavy scrap resulted from an openhearth program of changing from silica brick front walls with dry doors to basic brick front walls with archless door frames and water-cooled doors. The relatively frequent replacement of front walls of the old silica construction afforded the opportunity to charge all of this bulk scrap as it was made. However, the new basic construction eliminated the frequent front wall replacements, as well as the numerous opportunities to charge these large pieces of scrap. Thus, the need for cutting equipment of large capacity became important at the Minnequa works.

The Oxweld C-60 torch was put in operation in the openhearth dept. and is handled in the same manner as other shop services. This appears to be important because the biggest factor in the successful low cost operation of this torch is its low cost operation and maintenance.

The mounting of the torch at Pueblo is somewhat different than those seen in other steel shops. For greatest utility, the torch runs on a track over a beam mounted on a heavy base pedestal as shown in fig. 1. This facilitates its use anywhere in the plant, because the entire machine can be moved anywhere. The beam carrying the torch swings in a complete circle about the base while the motor drive moves the torch in a radial direction. The feed through the cut and the elevation of the cutting head are manually controlled by a rack and pinion arrangement. This is shown in fig. 2. Cold ingot, skulls or other large masses of metal are placed in the circular position around the base and the beam carrying the torch is moved manually to the point where cutting is to be done.



by R. SMITH

Superintendent, Open Hearths, Minnequa Works,
Colorado Fuel & Iron Co., Pueblo, Colo.

SUMMARY: Powder cutting of buttons and skulls up to 60 in. thick is used by Colorado Fuel & Iron Co. for cutting these large chunks to openhearth charging size. Handled by the same crews and in the same manner as other shop services, cost of operation of the huge C-60 Linde cutting torch has been low. Cost figures as well as techniques are detailed in this article.

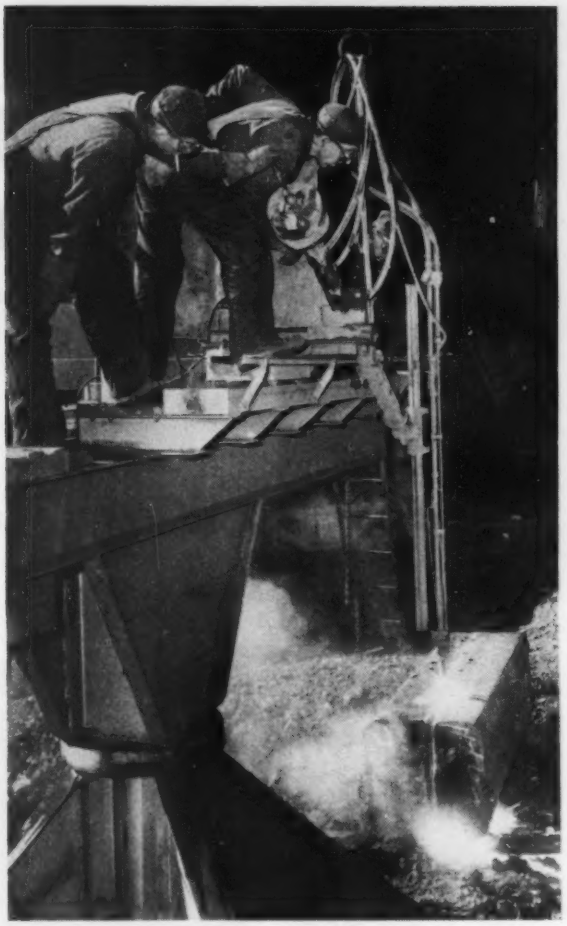


FIG. 2—Powder cutting through this ingot is possible with the new C-60 Oxweld cutting torch. This is a mixer-type blowpipe using an Oxweld W-42 machine heating blowpipe for mixing preheat gases.

Formerly, torch operations were confined to the south end of the slag yard of this mill. It is now possible to move the torch to the skull cracker to cut up some of the large chunks not easily broken with the drop ball. No water cooling is required, an item of extreme importance where using the equipment near the skull cracker where there are no water or sewer connections.

When first installed, it was necessary to develop a routine that would minimize delays from the standpoint of crane service in relation to high cutting rates. It was found faster to make two cuts through a slag free steel button by starting the cuts halfway up the side, and then cutting the button in two pieces. This necessitates starting the cut at either the top or bottom. These practices, were found important in obtaining low cutting costs.

After the operators gained experience they were able to cut 50 tons of buttons in an 8 hr turn, although the average output is nearer 40 tons. Cutting costs will vary with the cutting conditions. In July, there was a natural tendency to select the cleanest steel and cut it. During August the pile of steel in the slag yard consisted of the most difficult pieces to cut, and resulted in higher costs than reported in July.

Table I shows actual costs for August. This total was well within the cost estimates of the cutting torch and its operation, used in the request for authority to purchase the equipment. However, costs of $2.00 per ton for cutting clean steel buttons were made on many occasions during July. By Oct. 1, the original accumulation of steel to be cut was reduced to less than 2000 tons and it is felt that the entire lot will be completely cleaned up by Dec. 1.

TABLE I

Costs of Torch Operation, August 1949

Number of turns operated	24
Weight of steel cut	595 tons
Cost of oxygen, 500,000 cu ft	$1550
Cost of acetylene	$ 180
Cost of cutting powder, 1000 lb Oxweld No. 2 cutting and scarfing powder	$ 185
Cost of ¼ in. pipe used as lances	$ 155
Cost of labor	$ 568
Total operating cost	$2638
Cost per ton cut	$ 4.43

Plate Mill Modernization
At Central Iron & Steel

By JOHN ANTHONY
Eastern Regional Editor
The Iron Age

FIG. 1 — Slabbing operation on the newly installed blooming and slabbing mill at Central Iron and Steel Co. The addition of this mill and other facilities will increase plate mill capacity to 540,000 tons a year, a 90 pct increase.

THE plate mill capacity of Central Iron & Steel Co., Harrisburg, Pa., has been stepped up by an estimated 90 pct as the result of plant improvements now virtually completed. At present, annual capacity is rated at 288,000 tons of sheared and universal plate. The new facilities, which have been installed, raise the plate capacity to 540,000 tons a year.

The improvements are designed to achieve maximum output from the plant's three plate mills, to diversify its plate products in the direction of heavier gages and greater lengths, and to assure maintenance of quality control. The improvements will also permit the openhearth shop to top pour larger ingots, eliminating bottom pour with its loss in scrap.

The heart of the improvement program is a newly installed 28 x 72 in. blooming/slabbing mill now equipped with slabbing rolls, an edger together with hydraulic shear with automatic gage and slab pilers. There are new soaking pits with fully automatic controls, and new continuous slab heating furnaces. With new ingot and slab transfer equipment and other facilities, the improvement program which was started more than a year ago, represents an expenditure of more than $5 million.

It had been necessary heretofore for the plate mills to roll from slab size ingots or slabs rolled on the universal mill. Ingots were poured in 50 to 60 sizes from 8x10 in. up to 16x54 in. Bottom pouring was necessary to make the small ingots, with a loss of 3½ to 5 pct scrap in the sprues. There was also a heavy scrap loss in the rolling of the slab size ingots. The universal mill was required to slab about 10,000 tons of ingots a month, representing an equivalent loss of plate tonnage. The new facilities permit rolling heavier plate and larger sizes in heavy plate.

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SUMMARY: Plate mill capacity has been virtually doubled at the Harrisburg plant by adding a blooming and slabbing mill, together with soaking pits, continuous slab heating furnaces and other improvements to the extent of $5 million. The problems of the openhearth shop have also been simplified by eliminating the need for many of the small slab size ingots and for bottom pouring. The new soaking pits and rapid handling of heated ingots and slabs are expected to assure plate quality.

The blooming/slabbing mill and soaking pits are located in an "L" shaped building, which also includes transfer facilities to the adjacent 126-in. mill. The new pit building is served by two railroad spurs entering the building. Roller transfer tables are so arranged as to permit fast transfer of heated ingots or partially rolled ingots from the blooming/slabbing mill to the 126-in. mill.

A section of the 126-in. mill table has been opened so that the transfer table from the blooming mill can take its position at the 126-in. mill, deliver slab or ingots and return on its track to the blooming mill. Then the transfer table of the 126-in. mill returns back in line.

The capacity of the blooming/slabbing mill, fig. 1, is set at 60 to 90 tons an hr. Automatic electric controls designed by Central are installed in a pulpit built above the receiving side of the mill. These controls are operated by two men. Blooming mill bearings, fig. 2, are fiber, lubricated with water. An artesian well inside the building supplies water for mill requirements.

The mill is powered by a high pressure twin cylinder reversing engine which develops 3500 hp at 160 psi steam pressure. Power is furnished by two Westinghouse motor generator sets.

Steam to power the mill is furnished by two new Babcock & Wilcox boiler installations operating at 1300 boiler hp each. The boilers operate at 275 pct rating. Boiler feedwater is treated by equipment made by International Filtering Corp. Waste heat from the soaking pits is used to generate steam in the boilers. Both boilers are also equipped with oil burners. Boilers have jet type venturi stacks of the Eisley type.

Tapered vertical rolls for the blooming/slabbing mill edger are driven by two 500 hp motors driving a single shaft. The hydraulic shear, fig. 3, was made by Pittsburgh Engineering & Machine Co., who also made the shear table, crop pusher and pilers.

A new 9-hole soaking pit has been built to assure uniform ingot holding temperatures. Six pits have been completed, the remaining three to await the needs of subsequent expansion. Soaking pit capacity will be 60 tons an hr. Pits

FIG. 2—Roll bearings for the blooming and slabbing mill are made of fiber and are lubricated with water. Water supply lines to the bearing are shown here. An artesian well inside the building furnishes water to the mill.

are one-way fired with Bloom burners. Temperature indicating and recording equipment is a Brown Engineering Co. installation. All other controls are by Hagan, including air-fuel ratios and furnace pressure controls. The pits, 8 ft 3½ in. x 20 ft 6 in. inside, were designed and built by Central. Pit air is pre-heated by passing it over the waste gas flues.

Pit covers, designed by Detrick, were built by Central. They are operated by means of an Alliance pit cover crane. Pits are serviced by two 15-ton Morgan vertical chargers. There is also a 25-ton Milwaukee service crane in the pit building.

Slabs are transferred from the mill on Central designed and built narrow gage slab cars to storage and reconditioning yard for final distribution to mill. It is expected that a large percentage of these slabs will be delivered hot to the plate mill.

A continuous slab heating furnace has been installed for the 89-in. mill. The capacity of this plate mill is expected to reach 600 tons a day, an increase from the previous maximum tonnage of 367 tons with one continuous furnace and four in-and-out furnaces. Another continuous furnace is also to be built for the universal mill, which should expand the capacity of this mill to 500 tons a day. The 126-in. plate mill already has a capacity of 500 tons a day.

The ingot production needed to meet maximum plate mill requirements of about 45,000 tons a month is produced by five openhearths having a total capacity of 40,500 ingot tons a month, and an electric furnace with 4500 tons a month. Hot metal to produce this tonnage is provided by three cupolas with a capacity of 20,000 tons of hot metal a month. Additional ingot capacity is available from the six openhearths located at the recently acquired Phoenixville, Pa. plant.

The virtual doubling of the plate capacity of the mills is preparatory to the entry of the company into a more diversified line of products. There is a new plate fabricating shop at the plant with an area of about 72,000 sq ft. Recent additions to fabricating shop equipment include 16 ft bending rolls, press brake and a stake welder for pipe. Specially designed hydraulic equipment for hydrostatic testing of pipe has also been added. An additional 72-in. hydraulic press is about to be installed for flanged and dished heads.

The company has completed plans to install a new pipe mill to produce expanded steel pipe in diameters from 6 in. to 20 in.

One of the most significant aspects of the plant expansion program is the use of the company's own operating and technical experts in the layout, design and construction of plant equipment. Overall design and engineering was headed by Frank L. Estep, consulting engineer for Barium Steel Corp., A. E. Eck, consulting engineer for Central, and William F. Zerbe, vice president of operations; by J. G. Coutant, refractories, steam and fuel engineer for Barium, and John Rawlings, a nationally known expert on the construction and operation of soaking pits. All construction was under the executive direction and approval of J. A. Sisto, chairman of the board, and Rudolph Eberstadt, president, Barium Steel Corp.

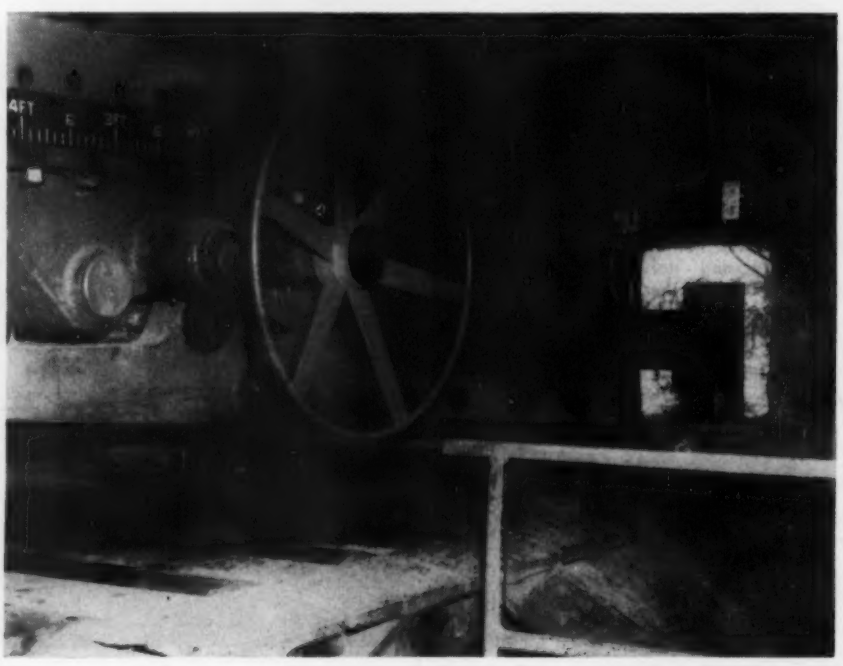

FIG. 3—Shear for the blooming and slabbing mill showing automatic cut-off gage. The shear is designed to handle the maximum output of the mill, estimated at 60 to 90 tons per hr.

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Automatic Testing of Arc Welding Electrodes

BECAUSE of the dexterity of experienced welders employed in test laboratories, compensating by manipulation for the functional deficiencies of welding electrodes, the usability of electrodes in the hands of operators of average skill is difficult to determine. To overcome this handicap, automatic welding heads, such as shown in fig. 1, were developed in the welding and electrical laboratory of the U. S. Naval Engineering Experiment Station, Annapolis, Md.

These welding heads are employed in a screen test to determine the functional characteristics of electrodes, independent of the human factor. Commercial produced heads contain mechanical feeding devices composed of gear trains and friction wheels whose inertia and slippage do not permit response to the instantaneous changes that occur in arc welding. The reactions of the experienced welder are fast enough to respond to these changes and make the appropriate correction. The welding heads designed by Naval Engineering respond in full to changes in the welding arc at speeds even faster than the fastest human reaction.

Two different welding heads are employed in this work. One is designed to deposit electrodes in all positions, and the other for welding in the flat position. The basic portions, shown in fig. 2, of both machines are identical. The feeding apparatus is a closed hydraulic system consisting of the inclined guide tube into whose ends is joined the smaller tubing to form a closed circuit. Within the inclined guide tube is a soft iron piston with sharp edged flanges and the tube is equipped at both ends with hydraulic leather cups. Mounted slidable, outside the guide tube, is an armored solenoid whose overall length equals that of the iron piston.

When the solenoid is energized from an independent source, it and the piston become an integrated mass in so far as the pressure exerted on the fluid contained within the tube system. Thus, if there were no valves in the system, the combined weight of the solenoid and the piston would cause them to sink toward the bottom of the inclined guide tube. The rate of this sinking can be governed by a needle valve.

Attached to the solenoid is the electrode holder that contains an automatic magnetic starting device to strike the arc. The electrode holder is connected to one leg of the welding circuit, the other as usual is grounded on the work.

In flat welding, as in fig. 1, the electrode represents the height of a 90° triangle. The inclined guide tube is the hypotenuse, and the target or weld is the base of the triangle. As the armored solenoid, which is really the electrode carriage, travels downward on its fixed path, the electrode travels parallel with itself getting shorter as it is consumed by the arc. The base of the triangle, which is the length of the weld head, can be made shorter or longer by changing the angle of inclination of the guide tube.

On manually controlled apparatus, the armored solenoid carries two electrode holders, one on either side. This tube is arranged to pivot so that on depositing an electrode it is turned 180° when the piston is again on top and the other electrode holder ready to engage a new electrode.

The full automatic head works on the same principle as the manually controlled apparatus,

SUMMARY: An apparatus for testing the usability of arc welding electrodes, eliminating entirely the human factor, has been developed by the Naval Engineering Experimental Station. Its construction and use are described in this article.

except that, because for vertical and overhead welding the electrode travels upward, positive pressure is exerted by substituting a pump for gravity. Rate of feed is controlled by a special, low-inertia valve, which in turn is actuated by an electronic system arranged to respond to small variations of the arc voltage.

In automatic welding, the electrode is held approximately perpendicular to the target. The holder travels along an inclined path which is the hypotenuse of a triangle in which the electrode is the height and the target the base. In traveling downward along the forced path, the electrode remains parallel with its initial position, thus shortening the height of the triangle as it is consumed.

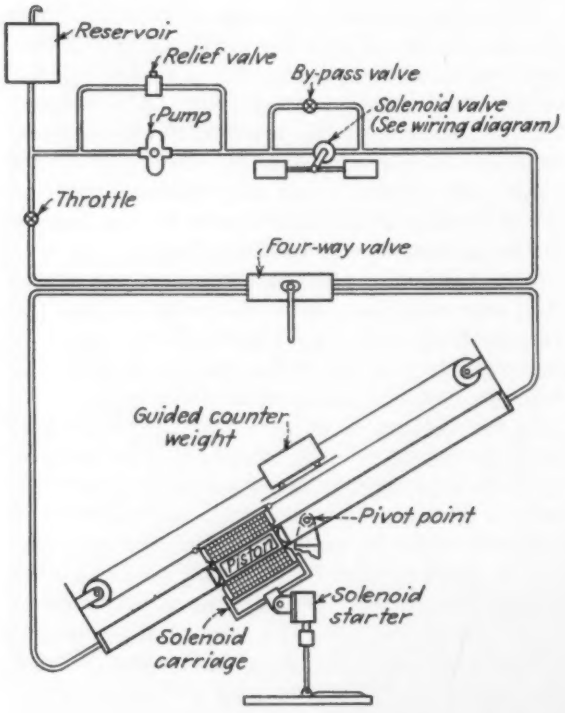

FIG. 2—The mechanical details of the automatic welding head.

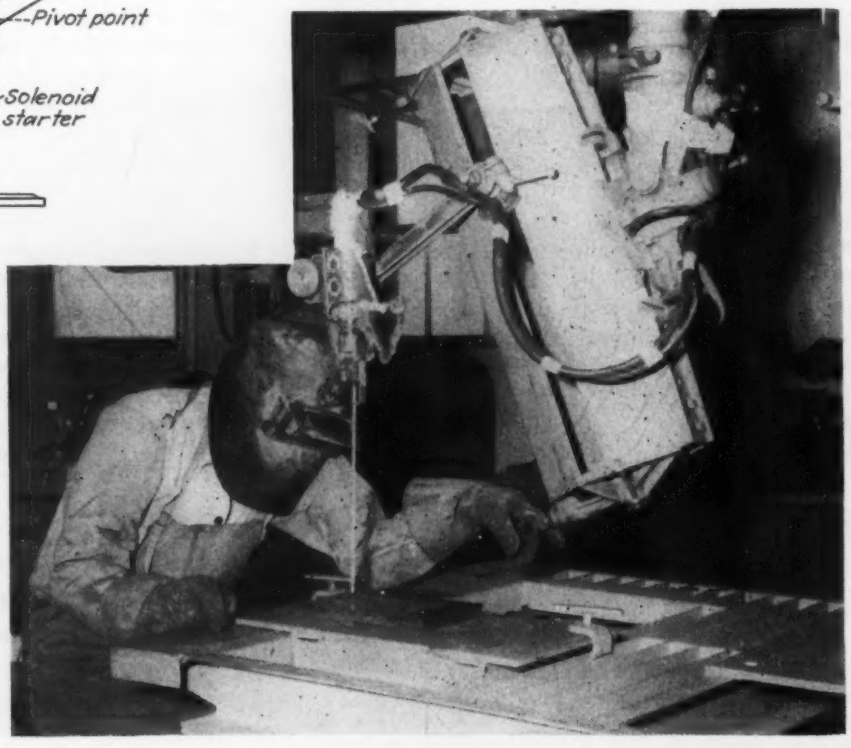

FIG. 1—By manual control of feed valves, the operator can control the rate of electrode feed either by watching a voltmeter or by observation of the arc.

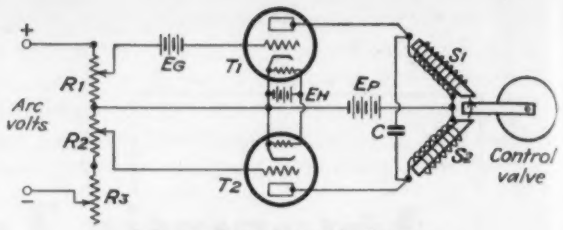

FIG. 3—The electrical diagram of the automatic welding head.

The electrode holder is powered by hydraulic pressure regulated by a practically inertia-less valve mechanism. This valve in turn is controlled by two Thyratron tubes biased to commutate on potential variations of the order of $\pm$ 1.5 v. Thus, when the desired arc potential has been established by adjusting the resistance R_3 on fig. 3, the machine deposits the electrode and automatically maintains the desired arc voltage through the deposition.

In the semiautomatic welding head, the electrode is actuated by a hydraulic system, but the driving force is gravity and the arc length is maintained by manual operation of either of the valves at the top and bottom of the cylinder.

The operator keeps his hand on the lower valve and watches the voltmeter rather than the arc. By manipulating the valve, he controls the rate of electrode feed, slowing it by closing the valve or speeding it by opening the valve. Thus, he controls the arc length or voltage, using the voltmeter as a guide.

If the voltage rises, the arc is lengthening, and if the voltage drops, the arc is shortening. Arc length can also be governed by direct observation.

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Molybdenum Separation in Iron Alloys

By R. S. YOUNG and A. LEIBOWITZ

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SUMMARY: Various reference sources disagree on the behavior of molybdenum in the ether extraction method for separating iron. An investigation was conducted to determine more clearly the proportion of molybdenum accompanying iron into the upper ether layer.

THE separation of iron from many other elements in chemical analysis can be easily and effectively carried out by extracting ferric chloride with ether. This method is frequently employed to remove iron prior to the determination of small quantities of aluminum, copper, cobalt, chromium, nickel, manganese and other elements in iron and steel. Molybdenum is one of the few elements which accompany iron into the upper ether layer. The manual of U. S. Steel Corp.[1] states that molybdenum is the only element which is completely extracted by ether, whereas Hillebrand and Lundell[2] indicate that 80 to 90 pct of the molybdenum is extracted and passes with the iron to the upper ether layer. In view of this discrepancy between authoritative reference books, it was considered advisable to investigate the behavior of molybdenum in ether extraction.

A known quantity of molybdenum, in a solution of ammonium molybdate, with and without varying quantities of iron and other elements, was extracted with ether in hydrochloric acid solution. This was done in accordance with recommended practice for the ether extraction of iron. After evaporating the chloride solution of the oxidized metals to a paste, the salts were dissolved in a minimum quantity of HC1, 1.10 sp gr. The sample was transferred to a separatory funnel, rinsing the beaker with 1.10 sp. gr HC1. The concentration of iron did not exceed 1 in 10 ml HC1, and for each 20 ml of solution at least 30 ml of ether was employed. The separatory funnel was shaken for 3 to 4 min. A second extraction was carried out on the lower aqueous layer, using the same volume of ether as for the first. In both extractions the ether layer was transferred to a 600 ml beaker, rinsing the funnel with two 30 ml portions of ether. After evaporating the ether, molybdenum was determined on the extract by the familiar alpha benzoin oxime procedure as recommended by the Climax Molybdenum Co.[3]

As a check on the work, molybdenum was also determined on the lower aqueous layer, and in all cases the combined molybdenum contents were found equal to the quantity of this element added originally.

Molybdenum Separation

Continued

Some typical results are shown in table I. In no case, with two separations and the standard procedure outlined above, was molybdenum completely extracted. Furthermore, the reproducibility of results was not good. Molybdenum, when alone and dissolved in hydrochloric acid, was extracted to an extent of about 86 pct; prior oxidation with nitric acid increased this to about 90 pct. In the presence of 1 g of ferric iron, whether exidized with nitric acid or not, recovery of molybdenum was approximately 90 pct. With 5 g of ferric iron, extraction was increased to around 95 to 97 pct, and higher iron concentrations did not increase the recovery of molybdenum.

Variations in the quantity of molybdenum present and the ratio of iron to molybdenum did not have any appreciable effect on the results. In the presence of other major alloying elements in steels or nonferrous materials, but in the absence of iron, extraction of molybdenum was only around 80 pct. This is unfortunate, since the ether extraction procedure might have been usefully employed for many analyses of complex materials if virtually 100 pct extraction of molybdenum could be attained.

Results indicate that molybdenum in steel varying from approximately 0.57 to 5.7 pct cannot be completely extracted with the usual ether separation, using two extractions. The recovery of molybdenum increases as the quantity of iron present increases, but above a ratio of 5 g Fe to 50 mg Mo no further extraction of the latter results. The maximum extraction appears to be about 96 to 97 pct. The statement of Hillebrand and Lundell[2] that 80 to 90 pct of the molybdenum is extracted by an ether separation is correct if molybdenum is treated alone, if other alloying elements are present, or if about 1 g of iron is present.

With 5 g or more iron present, the extraction can be increased to 97 pct, but the authors have not been able, with two separations, to attain the complete separation reported by the U. S. Steel Corp.[1] It may be that the latter observation was based on work with low concentrations of molybdenum in the presence of iron, where the difference between 97 and 100 pct extraction would be within the limit of experimental error.

TABLE I

Ether Extraction of Molybdenum

Mo Present, Mg	Other Elements Present	Mo Extracted, Pct
56.8	Nil	86.5; 85.6
56.8	Nil, but oxidized with HNO_3	90.3; 90.4
56.8	1 g Fe as $FeCl_3$	91.2; 89.5
56.8	1 g Fe as $FeCl_3$ oxidized with HNO_3	90.4; 91.9
56.8	5 g Fe as $FeCl_3$	97.8; 95.4
56.8	5 g Fe as $FeCl_3$ and an addition of 1 g Fe to second extraction	96.7; 97.2
56.8	10 g Fe as $FeCl_3$	95.6; 96.2
28.4	5 g Fe as $FeCl_3$	96.2; 95.2
113.6	0.5 g W, Co, Ni, Cr; 0.1 Mn, V, Ti, Cu	81.0; 81.0

[1] *U. S. Steel Corp., "Sampling and Analysis of Carbon and Alloy Steels," Reinhold Pub. Corp., New York, 1938.*

[2] *W. F. Hillebrand and G. E. F. Lundell, "Applied Inorganic Analysis," J. Wiley and Sons, New York, 1929.*

[3] *Climax Molybdenum Co., "Molybdenum Steels, Irons, Alloys," Climax Molybdenum Co. of Europe, Ltd., London, 1947.*

Induction Heating Medium Carbon Steels

ISOTHERMAL transformation diagrams for steels heated by induction may depart significantly from diagrams determined for furnace heating. Data obtained from end-quench specimens, to indicate transformation characteristics of several medium carbon steels and effect of austenitizing time and temperature on degree of carbide solution, were obtained by J. F. Libsch, Wen-Pin Chuang and W. J. Murphy, all of Lehigh University, and presented at the recent annual ASM meeting.

The data demonstrated that in plain carbon steels and alloy steels containing ferrite-strengthening elements only, the austenitizing cycle is of minor importance, and the transformation characteristics and properties to be expected for hardened and tempered steel are similar to those obtained by means of conventional furnace heating.

In alloy steels containing carbide-forming elements, the austenitizing cycle assumes primary importance. With induction heating cycles, using conventional hardening temperatures, the effects of these alloying elements are limited to restraint of austenitic grain growth, and possibly increased abrasion resistance, since these effects do not depend on solution of the carbides. The authors proposed that a significant combination of properties, involving high abrasion resistance and an optimum balance of strength and toughness may be produced in medium carbon steels by taking advantage of an induction heating cycle wherein the alloy carbides are only partially dissolved.

With induction heating cycles employing austenitizing temperatures 150° to 300°F in excess of those used in conventional hardening, alloy steels containing carbide-forming elements develop transformation characteristics similar to those associated with conventional furnace heating and without prohibitive grain coarsening. Under these austenitizing conditions, the alloying elements should provide all the specific effects in the quenched and tempered steel normally associated with furnace heating, although minimum case depths will not be obtained.

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Annealing Stainless Clad Steel Sheets

By E. W. WEAVER
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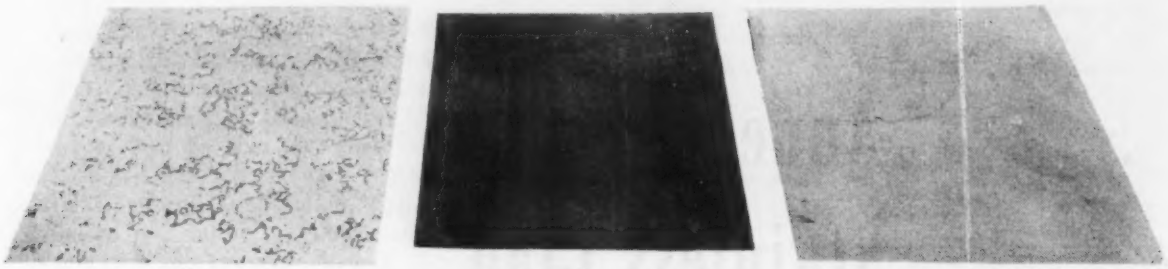
Toledo, Ohio

SUMMARY: Annealing stainless clad sheets in light gages by standard methods used for solid stainless or clad plate produced undesirable scale characteristics and made pickling difficult. A new furnace, designed specifically to cope with these problems and described in this article, produces a scale light enough to permit cutting the pickling time in half.

UNTIL recent years, production of stainless clad steel had been limited to plate and heavy sheet gages. A market existed for stainless clad in lighter gages, but it was essential that the material have a good surface on both the stainless and the backing steel sides. It was soon apparent, however, that existing equipment and cycles for annealing and pickling solid stainless were not suitable for light stainless clad. Annealing is generally performed in an open-fired muffle type furnace which, though entirely satisfactory for solid stainless, could not be adapted to light gage stainless clad because of the heavy "turtle back" scale it would raise on the carbon backing side of the bi-metal product. This scale pattern, shown in fig. 1(A), is often transferred to the stainless surface when deep or even moderate drawing is performed, and is difficult to remove.

In addition to eliminating this turtle back scale condition, it was necessary to produce an annealed stainless product which could be pickled with minimum difficulty. Nitric and hydrofluoric acids, the usual brightening agents for stainless steel, readily attack carbon steel; therefore, it was essential that the clad material have a minimum of scale on the stainless side, so the stainless could be cleaned with short cycles and sufficiently weak acid solutions to prevent over-etching the carbon side.

To meet these requirements, Surface Combustion Corp. designed a radiant tube continuous



A B C

FIG. 1—Condition of carbon steel back of open-fired sheet after pickling and annealing grinding is shown in A. Condition of carbon steel back after annealing in atmosphere furnace and de-scaling prior to pickling is shown at B, while C is the back of stainless clad sheet after light pickle. Surface has smooth finish comparable to hot rolled, annealed, pickled carbon steel sheets.

roller hearth furnace capable of continuous operation at temperatures up to 2050°F. The furnace, installed at the Alan Wood Steel Co., Conshohocken, Pa., is shown in fig. 2; this is followed by an air-quench unit in which the heated metal is rapidly cooled below the scaling range of the carbon backing steel.

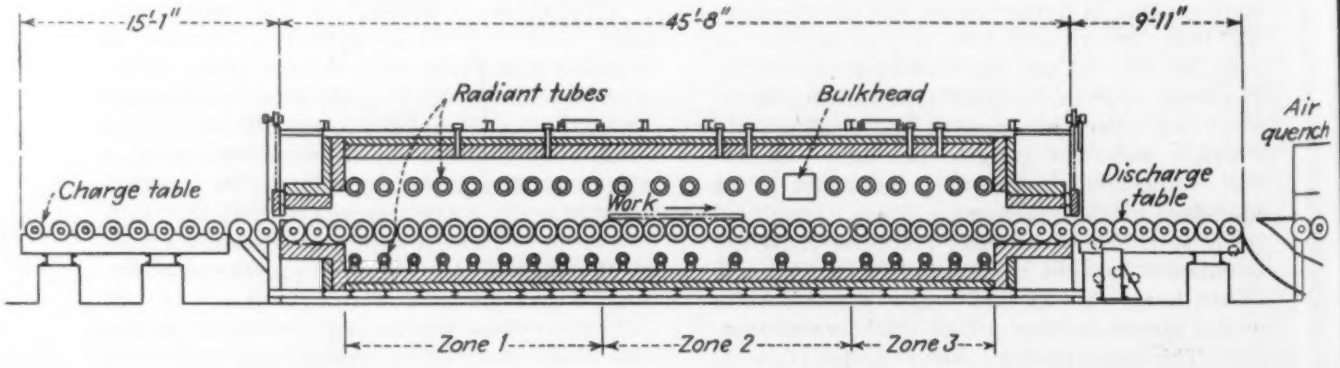
A cross-section view of the furnace is shown in fig. 3. Movement of the work through the furnace is by means of a disc-type roller conveyer. The radiant tubes are mounted both above and below the work and are gas fired, although they may be oil fired if desired. Overall length of the entire assembly, including loading and discharge stations and air-quench unit, is 87 ft 6 in., while that of the furnace proper is 40 ft. Furnace width is sufficient to accommodate sheets up to 52 in. wide.

Design of the furnace, radiant tubes and conveyer is in some respects unusual. The 40 tubes in the furnace are of carborundum with 10-in. OD for the upper set, and 7-in. OD for the lower. The relatively fragile nature of this material and the amount of expansion which occurs between hot and cold conditions are compensated by providing a movable tube mounting at one end of each tube; the mounting at the other end of the tube is fixed in the furnace housing. Expansion of the tube forces the mounting outward against cushion springs which return it to normal position when the tube cools. The expansion ends of the tubes are fitted with piston ring type seals which prevent leakage of the atmosphere from the furnace as the tubes expand and contract. The tube mounting rings are water cooled. Removal of the tube mountings permits easy tube replacement.

Thirty-one power driven disc type alloy steel rollers support and move the work through the hot sections of the furnace. The work is supported by seven discs mounted transversely on each roller, rather than by the surface of the roller itself. The bearings supporting each roller are water cooled, as are the roller ends. The rollers are sufficiently heavy to support several sheets stacked above one another, to a total thickness of approx 1 in.

Should replacement be required, the roller ends are carried in removable mountings. Any roller can be removed without disturbing the others, as the refractory blocks around the roller ends are sufficiently large to provide the necessary opening in the furnace wall.

The conveyer system, in addition to moving the work through the furnace and air quench, provides 15 ft of power-driven rollers up to the charging door. The charge end is equipped with a 30-in. tunnel in which five more rollers are mounted. A similar tunnel 36 in. long is used at the discharge end; this is followed by 12 more ft of rollers to the air quenching unit. Normal drive speed of the work is maintained for 55 ft 6 in. From that point, roller speed is increased to provide a fast discharge and movement of the



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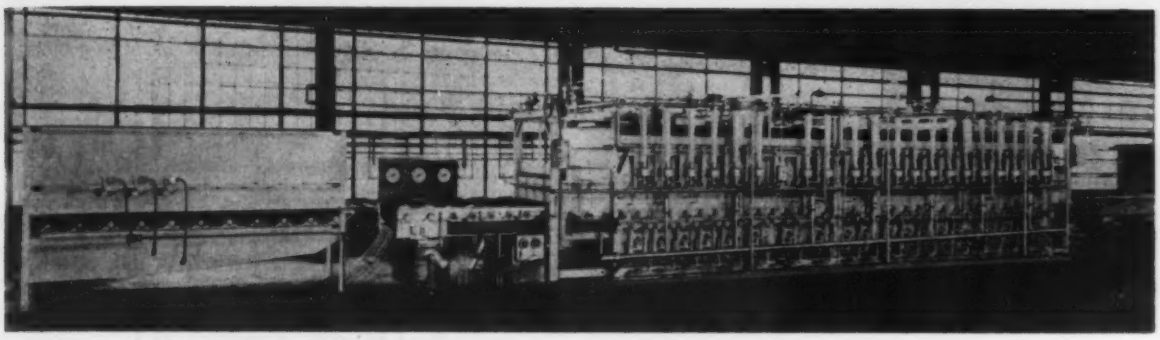

FIG. A—View of the radiant tube furnace installation showing the air quenching unit at the left.

work into the air quench. Two 5-hp motors furnish power for both the normal and fast discharge sets of rollers, including those in the furnace proper. Speed may be varied from 1 to 8 fpm, but usually is from 3 to 4.5 fpm. A gasoline engine can furnish standby power for driving the conveyers.

The air quench consists basically of the roller conveyer and two "wind boxes" enclosed in a housing approx 15 ft long and 6 ft wide. As in the furnace, the rollers are disc type, which allow the cooling air to circulate freely on the bottom of the work. From the upper and lower wind boxes, numerous small tubes extend downward and upward respectively to direct the air at high velocity against the surfaces of the work. Both boxes are supplied by ducts leading to a single 20,000 cfm air blower. An adjustable vane permits dividing the total air supply between upper and lower boxes as desired. Power for the blower is furnished by a 75-hp motor, making a total of only 85-hp for the entire annealing and quenching conveyer and cooler.

The furnace is divided into three zones, although the piping and burners are the same for all three. Heating to temperature occurs in about the first 16 ft of furnace length, and holding or soaking in the next 24 ft; some cooling occurs in the remainder of the furnace length, in the discharge tunnel, and on the conveyer table leading to the air quenching unit. Furnace temperature in the heating and holding zones is maintained at from 2000° to 2050°F, which heats the work to from 1975° to 1985°F. Discharge temperature from the air quench ranges from 550° to 900°F, depending upon the thickness of the stock. Heating and soaking time ranges from 7 to 13 min, again depending upon stock thickness. The furnace was designed to produce 5000 lb per hr of No. 12 to 14 gage material, and experience to date indicates it will produce its rated capacity.

When operated on gas with value of approximately 525 Btu, the normal consumption is in the range of 17,800 to 18,400 cu ft per hr for furnace heating, and about 14,000 cu ft per hr of DX gas for the furnace atmosphere. The oil standby equipment is designed for a fuel consumption of 65 gal of No. 3 oil per hr. The slightly deoxidizing DX atmosphere is supplied by a Surface Combustion prepared atmosphere generator located about 40 ft from the charge end of the furnace.

The sheets are generally placed one on top of the other with the stainless faces together for annealing. The rate of air quench is rapid enough to cool both pieces simultaneously. Two individual thicknesses as great as 7/16 in., or a 7/8 in. total, have been processed in this manner without difficulty, although commercial production is generally confined to lighter gages.

Carbon penetration from the carbon steel back into the stainless facing is prevented by an electro-deposited coating of nickel or iron between

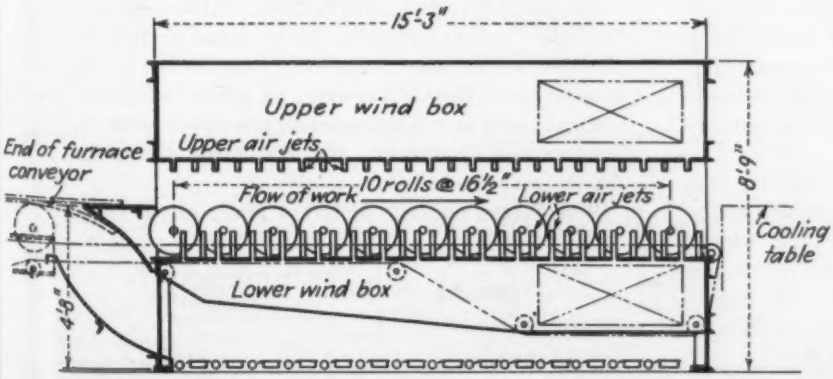

FIG. 2 — Longitudinal section of SC furnace and air quenching unit installed at Alan Wood Steel Co. showing roller conveyor with power driven charging and discharging rollers.

the two materials before the sandwich is made. This plating acts as a barrier to prevent the migration of carbon to the stainless, and also insures a bond between the stainless and backing steel.

The difference in scaling resulting from open-furnace annealing and annealing in the atmosphere furnace is shown in fig. 1; comparison of the pickling operations required after annealing further illustrates this point (see table I).

TABLE I

Pickling Cycles

Open Furnace Anneal	Atmosphere Furnace Anneal
Caustic descale, 20 to 30 min	Caustic descale, 20 to 30 min
Water quench	Water quench
Pickle—10 pct sulphuric acid, 20 min temp, 180° F	Pickle—10 pct sulphuric acid, 7 to 9 min temp, 150° F
Hose	Water rinse
Nitric acid—10 pct	Nitric acid—8 pct
Hydrofluoric acid—2 pct, 20 min at 120 to 140° F	Hydrofluoric acid—2 pct, 2 to 10 min at 100° F
Rinse	Rinse
Neutralizing dip	Neutralizing dip
Total immersion time, 60 to 70 min	Total immersion time, 29 to 49 min

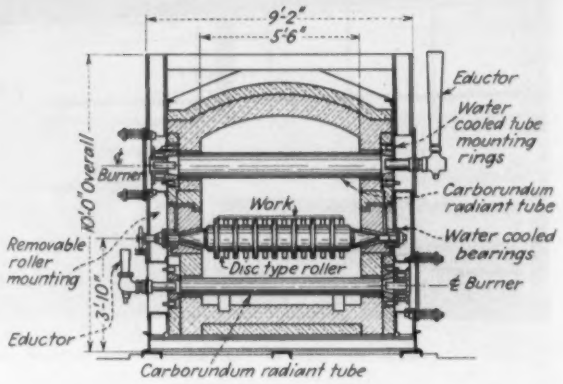

FIG. 3—Cross section of SC disc type furnace showing roller design, carborundum radiant tubes, and water-cooled bearings.

A new pickle house was installed at the same time as the furnace. This pickle house was designed especially to handle the stainless clad sheets produced in the new furnace.

The new furnace and pickle house are being used to finish Alan Wood's Permaclad stainless clad sheets, which are available in either No. 1 or No. 4 finish.

Novel Vise Jaws

Increase Production

by ROBERT MAWSON
Providence, R. I.

FOR simple machining operations, the tendency is to do the work by a layout method. However, if the job is intricate or the results of the operation must be accurate, then the need for special tools is realized and jigs and fixtures are designed and made for the machining work. However, special tooling for the simpler work is also advantageous because its use reduces production costs.

A large midwestern machine tool builder, uses many filister head screws, such as shown in fig. 1. These screws are similar in all details except the lengths of the threaded portions, which are 7/16, 9/16 and 11/16 in. respectively. The simple operation on these screws is milling a 0.072 in. wide slot in the head with a No. 13 saw.

To follow its cost reduction policy this plant machines the slot in special vise jaws. The first design of this tool had two jaws secured to the vise, one jaw to the solid portion of the vise and the other jaw fastened to the movable portion of the vise. The jaws had half round holes to fit around the screws. However, by using two jaws, the tool could only accommodate one row of screws. To increase production, the vise jaws, shown in fig. 2, were made.

The fixture consists of left *A* and right *B* hand

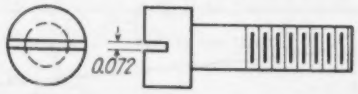

FIG. 1—Fillister head screws of the type milled in this fixture.

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jaws, made of machine steel, case hardened, which are secured to the vise anvils with ½ in. bolts. Between these jaws is a center jaw *C* made of machine steel, case hardened, which is a floating member although it is guided by two filister head screws *D* threaded into the right jaw *B*.

Four tension steel springs, *E*, are placed between the two anchored jaws and the floating jaw to keep the floating jaw in balance. Six tool steel pins *F*, threaded into each end of the jaws, fit into holes in two side plates for the jaw *A* and through short horizontal slots in jaws *C* and *B* to keep them in proper alignment. In the three jaws are machined half-holes, 15 in *A* and *C* and 15 in *C* and *B* of the correct size to suit the body of the screws to be milled.

With this equipment alone, it is tedious for the operator to load the 30 holes provided for the screws. To simplify loading, two 1/32 in. spring steel plates, *G*, in which 30 holes were drilled in the proper relation to the holes in the vise jaws, were made.

The jaws, *A* and *B*, are first attached to the anvils of the vise. The two side plates were then placed in position with the pins, *F*, located in the holes or slots. Fifteen No. 13 saws with the proper spacing collars are mounted to a milling machine arbor.

One of the plates, *G*, is loaded with 30 screws to be milled, and is placed on top of the vise jaws. When the screws have entered the half holes in the vise jaws the vise is tightened. This moves the jaws *B* and *C* toward jaw *A* to hold the screws in place. The milling machine is then started in operation and the table, carrying the loaded vise jaws, feeds under the revolving saws and the slots are machined.

During the milling of the slots in the 30 screws, the second plate *G* is loaded with another 30 screws. After completion of the milling cycle, the vise is released and the finished plate of screws is lifted out. The loaded plate is then placed in position on top of the vise jaws and the cycle repeated.

These vise jaws locate the screws accurately and hold them securely during milling. With the loading plate feature, the milling operation is practically a continuous production job, the only lost or unproductive time being the short period required to remove a plate of finished milled screws, place another loaded plate in position, and tighten the vise.

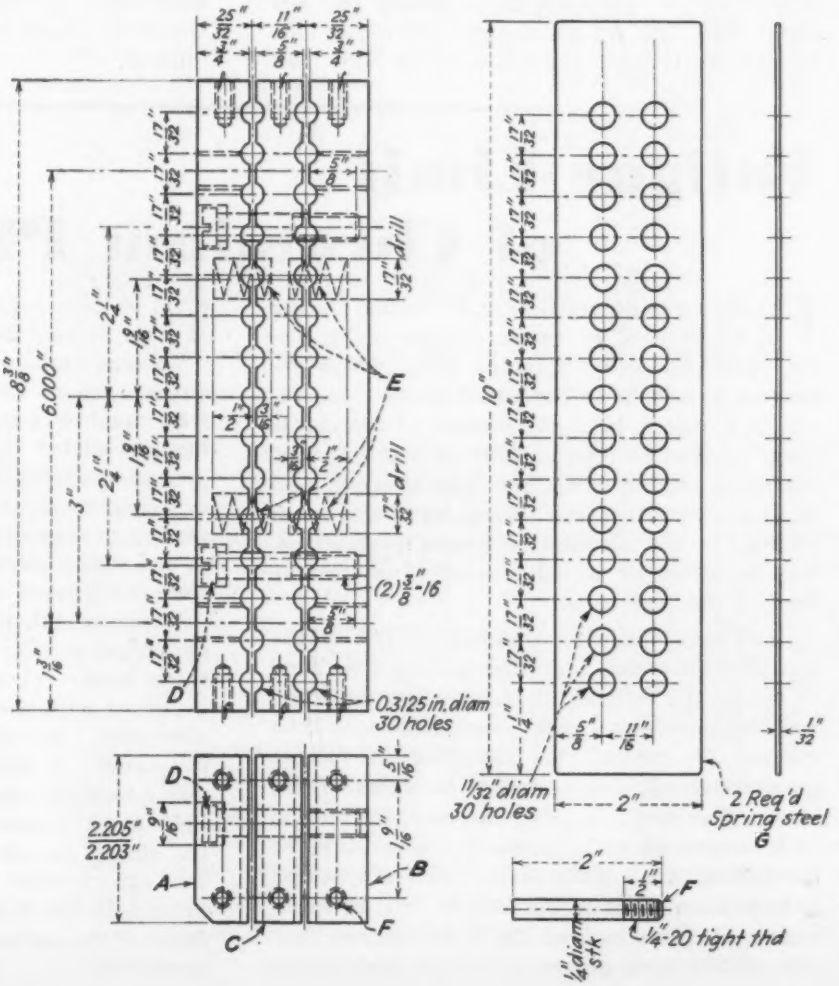

FIG. 2 — Thirty blanks are slotted in a single pass with this three piece set of vise jaws. Second plate G is loaded while first batch is being machined.

Weld Repairing Heavy Truck Castings

WHEN the chrome-moly cast steel arms of an Elwell-Parker die handler truck were broken because of 150 pct overload, repairs were made economically and quickly by welding.

The arms, 13 in. wide x 3½ in. thick, weighed 1750 lb each. Their broadsides are formed at right angles midway in an overall length of 8 ft. On the truck the horizontal portions of the arms are supports for the platform, one under each side. The perpendicular lengths are attached to the elevator mechanism in the truck's upright columns.

Each arm broke off in about the same diagonal line across the elbow, indicating there was no flaw in the castings or material; they had simply reached the limit of overstress.

A plan was devised by Elwell-Parker Electric Co., Cleveland, whereby the arms could be welded for strength and in positive alignment for functional operation. First, certain retaining and connecting plates that had been broken were replaced, and clamps and bracing were used so that the platform assembly was firmly held together. Lower connecting pins were released permitting the platform to be swung out and away from the truck's upright columns. This brought the elbows about 3 ft above floor level and free from any welding obstructions.

The edges of the fractures were beveled down to 45° angles to make two opposing V's, with their points ⅛ in. apart. Welding rods of the following composition were used: 0.30 to 0.40 pct C; 1.0 to 1.25 pct Mn; 0.30 to 0.40 pct Mo.

As alignment was essential, welding was done carefully to distribute heat and metal. Two welders were employed, one operating on each side of an arm. Two beads were welded along one side of the open V-shaped cut, then two along the other, each welder operating alternately, so that there was no severe drop in temperature that might cause warpage in the finished work. About 40 lb of metal was deposited in welding each fracture. Maximum thickness of the welded area was 4 in.

A series of loading and operational tests at the factory proved the repair to be satisfactory. The welds are believed to be fully as resistant to overload and shock as the original castings.

The truck was out of service for one week, and the cost of the repair job, including replacement of broken angle plates, was approximately $800; about ¼ the cost and 1/12 the time that would have been required if new parts had been ordered.

Fatigue Limit of Chromium Plated Steel

IN addition to decorative use, chromium plating is widely used on gages, cylinder walls, piston rings and other machine parts where resistance to wear is an important factor. According to a recent National Bureau of Standards study (technical report 1379) of the effect of chromium plating on fatigue limit of steels used in aircraft, however, the advantages of chromium plating, in the absence of proper precautions, may be offset by an adverse effect on fatigue limit of the base metal.

In all cases, involving specimens of SAE X4130 and 6130 rod tested, chromium plating was found to reduce the fatigue limits, although the effect was less pronounced under some conditions than others. In general, the reduction in fatigue limit increased with increased hardness of the steels. For steel of a given hardness, the fatigue limit decreased with increased temperature of the plating bath. While plate thickness appeared to have little effect on the fatigue limit of specimens plated in a bath at 130°F and current density of 350 amp per sq ft, no generalizations could be made regarding the effect of this factor at other current densities and temperatures.

Fatigue limits of specimens plated and subsequently ground to remove a part of the plating were equal to or greater than those of specimens initially plated to the same thickness as the ground specimens and tested as plated. Other experiments showed that interruptions of the plating process did not reduce the fatigue limit of the plated specimens provided proper precautions were taken for continuing the plating.

Three possible causes for the adverse effect of chromium plating on the fatigue limits of the steels were; (1) embrittling effect of hydrogen deposited with the chromium, (2) cracks in the chromium, and (3) residual stresses in the chromium. It was shown, however, that there was no simple relationship between the fatigue limit and the amount of hydrogen remaining in the chromium after a baking treatment. Further experimental evidence indicated that cracks present in the chromium were not the principal cause of the reduced fatigue limits of the plated steels.

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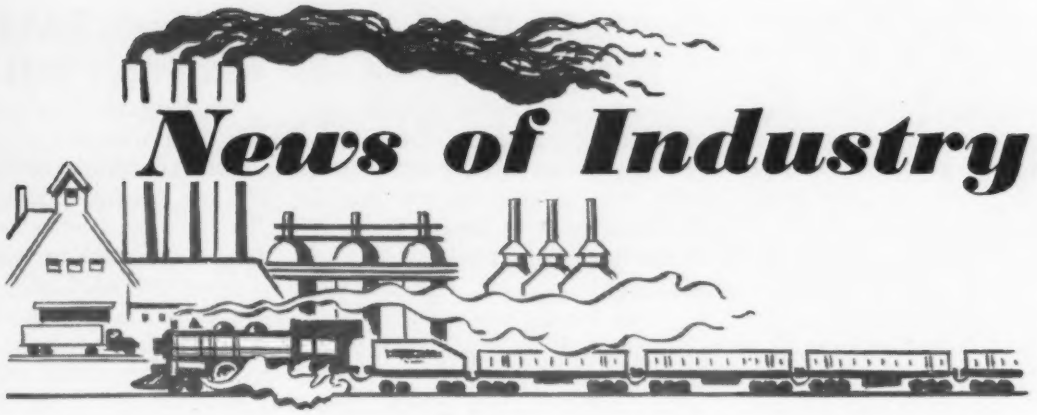

Lewis Threatened With Use Of Taft-Hartley Act by President

Prospects of the coal operators and union getting together appear dim.

Pittsburgh — President Truman's reply to a press conference question that he would use the Taft-Hartley Act if necessary to prevent resumption of the coal strike after Dec. 1 should an emergency exist at that time, was welcome news to steel producers who were worried over what a mine walkout would mean to their plans for high-level operations in the coming months.

The feeling is that should Mr. Truman invoke provisions of the act that John L. Lewis would agree to the 80-day truce it provides rather than risk having to pay another stopping fine as he was forced to do last week for refusing to obey an earlier injunction under that law.

Prospects Appear Dim

Although prospects of Mr. Lewis and the coal operators getting together meanwhile appear dim, there is always the chance that they will work out some kind of a settlement. The union president has expressed willingness to resume negotiations, but the operators, at last report, were standing on their post position that they will agree only to extension of the old contract, plus elimination of the "able and willing to work" clause, which has made it easy for Mr. Lewis to call strikes in the past.

Mr. Lewis is understood to want a wage increase and an increase in the per-ton royalty payments by the operators into his now-defunct welfare fund. The present payment is 20c per ton.

The miners resumed work several weeks ago after being on strike since Sept. 19. Previous to that, they had been working a 3-day-week, beginning July 6, at Mr. Lewis' command.

In his press conference comments, Mr. Truman ruled out the possibility that he would propose a fact-finding board outside the Taft-Hartley Act as he did in the steel dispute. Mr. Lewis, it was believed, would refuse to go along with such a proposal.

USWA Strike With Alcoa Continues

Union charges Alcoa offer is inferior to concessions of steel companies . . . Alcoa signs with the AFL.

Pittsburgh — Negotiations for settlement of the United Steelworkers of America strike against the Aluminum Co. of America blew up over the week-end, but conferees were expected to get together again this week in an effort to resolve differences.

The strike against nine Alcoa plants employing 16,000 USWA members began Oct. 17 over the issue of non-contributory pension and social insurance demands of the union. The union-company negotiators did not come together again until last Thursday.

At the conclusion of an all-day conference, vice-president James G. Thimmes of the USWA, charged that the company's offer was "substantially inferior" to concessions of steel companies. He critized particularly the Alcoa proposal with regard to disabled workers, said the pension plan was "arbitrary and unworkable," that the insurance proposal excluded union participation in its administration.

Company's Story Differs

The company had a different story. A spokesman said the union insisted upon injecting two other issues into the conferences—wage adjustments and pay for holidays not worked. The company said it

made an offer of a non-contributory pension and insurance program, and that at the time the conference broke up it understood that the union would consider this proposal and give its answer. The union's blast came as something of a surprise, Alcoa said.

Future conferences, according to Mr. Thimmes, will be through negotiating sub-committees. The company said it was waiting for the union to say the word.

Earlier, Alcoa had signed with the AFL aluminum workers a pension-insurance program, entirely company-financed, in keeping with the Bethlehem "formula" agreed to by the steel companies. The agreement covers five plants in which the AFL has jurisdiction.

Miehle Buys Star Electric

Chicago—Miehle Printing Press and Mfg. Co. has purchased all of the capital stock of Star Electric Motor Co. of Bloomfield, N. J., manufacturer of electric motors and generators, according to J. E. Eddy, Miehle president.

Austin Co. Wins Contract For Building Steel Pipe Mill

Cleveland — Contracts for design and construction of the 150,000 sq ft, large-diameter welded steel pipe mill to be erected in Houston for A. O. Smith Corp. of Texas have been awarded to The Austin Co., which has started work on the foundations.

A. O. Smith Corp. and Armco Steel Corp., whose Texas subsidiary, Sheffield Steel Corp., will supply the steel for pipe production from its adjacent mill, will be co-owners of the new plant, which will be operated by A. O. Smith Corp. of Texas.

Markets Steel Bridge Flooring

Wooster, Ohio — United Steel Fabricators, Inc., is marketing a new structural plate steel bridge flooring designed for replacement of wooden plank flooring on highway bridges. Principal advantages claimed include elimination of maintenance problems, reduced dead load and rapid installation.

LASTING TREASURE: CARE representatives who went to the library of the University of Liege, Belgium, recently to present a gift of new books purchased through donations of Americans to the CARE book program, found these copies of THE IRON AGE occupying a prominent space on the library shelves. The library is one of hundreds being reconstructed, after heavy wartime damage, through cooperation of CARE and UNRSCO.

GSA Allocates Funds For Reserve Public Works Planning

Washington—Nearly $19 million has been allocated by the General Services Administration to the 48 states, Alaska, Hawaii, Puerto Rico and the District of Columbia for reserve public works planning.

A total of $100 million for such planning has been authorized for use over the next 2 years but Congress appropriated only $25 million for current use. The remaining $5.6 million of the current fund has been held in reserve for distressed areas where unemployment may threaten.

Under the present allocation, no state received less than $90,000 while three states, Illinois, New York and Pennsylvania, received $1.1 million, $1.8 million, and $1.3 million respectively.

The present appropriation will put an estimated $750 million in blue-printed works on the shelf. Such plans have dwindled to about $2.5 billion.

Nodular Cast Iron Discussed

Washington — Latest developments in laboratory tests of nodular cast iron for commercial application were discussed last week at a meeting of the technical subcommittee, Foundry Industry Advisory Committee to the Munitions Board.

In addition to representatives of the Munitions Board, Army, Navy, Air Force, National Security Resources Board, and Tariff Commission, about 20 representatives of various foundry groups and firms were present.

Demonstrate New Paint

New York—A new anti-corrosion paint and technique of application which together form a protective coating tested to last 15 years were demonstrated for the first time in the United States last week by Holger Boldemann and Sten Jeurling of Antros, A. B. This firm manufactures the paint and its spray gun equipment in Stockholm.

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Close of Lake Shipping May Leave Hardship

Race is on to move 2 million tons of ore and coal before navigation season closes . . . Some hardship may result . . . Boat shortage is a factor—By BILL LLOYD

Cleveland—Time and a shortage of bulk carriers were threatening the outcome of a race to move an estimated 2 million tons of iron ore and coal before the close of navigation on the Great Lakes this season.

In a situation reminiscent of the war years, special marine insurance will go into effect Dec. 1, when the regular insurance expires. This insurance will apply to all shipments, including Lake Superior ports until Dec. 12, when it will expire. Additional special insurance will then go into effect covering shipments to all lake ports except Lake Superior until Dec. 31.

Coal Situation Urgent

Most urgent factor in this late season traffic on the Great Lakes is the coal situation at the head of the lakes. Coal supplies are acute at Lake Superior ports, according to Great Lakes shippers, who were predicting this week an all-rail coal movement to upper-lake ports this winter despite special insurance.

The iron ore situation is something of an anomaly to shippers and consumers alike. Prestrike estimates of fourth quarter steel operations led some consumers to cancel orders for iron ore. Many of these consumers' regular storage facilities were loaded to the point where only the tonnage consumed could be added to the piles. Post-strike demand prompted capacity operations in many plants, and some blast furnaces that were not a part of prestrike operations are going back into production.

Season's Total Still Good

Movement of 2 million tons of iron ore before Dec. 12 would bring the season's total to more than 70 million tons, less than 1947's 77,980,818 tons and last year's 83,484,562 tons, but still a big peacetime tonnage by prewar standards.

Lake shippers estimate total iron ore stocks at furnaces and Lake Erie docks at 46 million gross tons Nov. 1. Assuming consumption of 3.5 million tons in November and shipments from upper lake ports of 2 million tons, stocks should total about 45 million tons Dec. 1. On Dec. 1, 1948, according to Lake Superior Iron Ore Assn. figures, stocks totaled 45,160,225 gross tons.

Turned Down Tonnage

Projected steelmaking operations will probably require consumption of about 7 million tons plus of iron ore a month through March. This will bring the stocks down lower than they have been on Apr. 1, for several years. On Apr. 1, 1949, stocks on hand totaled 17,308,374 gross tons and on Apr. 1, 1948, 16,022,253 tons. But some observers believe that iron ore stocks on Apr. 1, 1950, will be no more than 13 million tons.

Focal point of concern regarding a possible iron ore shortage is Buffalo, where some consumers were unable to build up stockpiles adequate for capacity operations because of the steel strike. One consumer in the Buffalo area will be short of ore within 60 days as a result of putting another blast furnace into production — unless stocks can be substantially increased before the close of navigation.

"Miss Peabody I've been buzzing you for the last ten minutes."

Boat Shortages Is a Factor

Aggravating to some consumers is the fact that they were offered additional tonnage before the strike and, with good reason at that time, turned it down. Now, weather has closed down some mines and loading will be increasingly difficult during the next 2 weeks. Mines remaining in operation will have difficulty producing ore fast enough.

Practically as important as the weather, which could close in any time, is the shortage of boats. About half the bulk fleet is operating. The rest are tied up for the season. Of 313 boats, 151 are in operation, of which 115 are ore and coal carriers.

With this limited capacity, shippers have a battle on their hands. Early this week there was talk of using the Coast Guard's icebreaker *Mackinaw* to keep the lakes below Superior open until the bitter end, which some shippers, gazing grimly from office windows high enough to overlook the lake as the first snow flurries of the season swept over Cleveland, figured could not be far away.

British Electrical Team Expected

Washington—Both technicians and workers from the electrical industry will make up the 11th British productivity study group to visit here for a study of American methods. It arrives in late November.

Included in the study tour will be trips through plants making both manual and automatic motor starters (for industrial motors) and air brake switches.

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INDUSTRIAL SHORTS

IN BUSINESS — Stanley B. Amidon and Fred S. Gates, formerly New England representatives of Charles Dreifus Co., have announced the formation of the STANLEY B. AMIDON CO. at 901 Park Bldg., Worcester. They will engage in the brokering of scrap iron and steel.

GALA OPENING — With an open house on Dec. 2 the HYSTER CO. will formally open its new industrial truck retail sales and service building at 4445 Third St., San Francisco.

SWISS TOOLS — S. Lambert, S.A., Solothurn (Soleure) Switzerland, manufacturers of precision machine tools, has appointed the HAUSER MACHINE TOOL CORP., Manhasset, N. Y., its exclusive United States factory representative.

HEADS AIME—Donald H. McLaughlin, president of Homestake Mining Co., San Francisco, has been elected president of the AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS for 1950. Andrew Fletcher, president, St. Joseph Lead Co., New York, and Robert W. Thomas, general manager, Nevada Consolidated Copper Corp., Ray, Ariz., have been named vice-presidents.

ADDS TIN LINE—McVoy Sheet & Tin Plate Co., Chicago, tinplate warehouse, has been acquired by the KORHUMEL, HEFFRON & PREISS STEEL CO., Evanston, Ill. K-H-P will handle and warehouse the tin and tinplate products of McVoy from their facilities in Evanston.

NFA OFFICERS — Harry E. Ladwig, works manager, Foundries and Pattern Shops, Allis Chalmers Mfg. Co., Milwaukee, has been elected president of the NATIONAL FOUNDRY ASSN. A. V. Martens has been named vice-president and L. E. Roark, executive vice-president.

GALVANIZING PLANT — Announcement has been made of the newly organized BOYLES GALVANIZING CO., Tulsa, Okla., to handle galvanizing jobs. W. M. Boyles is president of the new firm and W. A. Brown, vice-president. They both previously held positions with the Rogers Galvanizing Co.

SERVING AGAIN — Harry Stave, Stave Bros., Philadelphia, was re-elected president of the Philadelphia chapter of the INSTITUTE OF SCRAP IRON & STEEL, INC. Other officers re-elected were: John F. Malloy, vice-president; Dominic J. Giordano, treasurer; and Joseph D. Bardon, secretary.

SOMETHING NEW — A new type conveyer belt for conveying hot materials has been announced by Republic Rubber Div., LEE RUBBER & TIRE CORP., Youngstown. The new product features a carcass constructed with multiple plies of glass fabric plus covers specially compounded to resist heat.

SALES REP—Barium Steel & Forge, Inc., Canton, Ohio, manufacturers of hammer and press forgings, has appointed PETROCHEMICAL EQUIPMENT CO., INC., Houston, as a sales representative.

ENGLISH CRANES—The Jones line of bantam-weight cranes, manufactured in England by K & L Steelfounders & Engineers, Ltd., are being distributed throughout the United States by TRACTOR & EQUIPMENT CO., Chicago, according to a recent contract between the two companies.

EASTERN MARKET—A new warehouse at 2835 Sisson St., Baltimore, has been opened by HORACE T. POTTS CO. to provide a complete stock of carbon, alloy, tool and stainless steels. J. T. Fritz will be in charge of the new warehouse.

National Steel Has No Plans In Mind Now for Chicago Mill

New York — Ernest T. Weir, chairman of National Steel Corp., told THE IRON AGE late last week that the company had no plans in mind to build a mill anywhere other than where the company now operates plants. Mr. Weir's statement was made to scotch a rumor that he planned to build a finishing mill near Gary.

The National Steel board chairman had written the U. S. Army Engineer office in Chicago on Aug. 4 saying that the corporation expected to develop property which it owns at Burns Ditch, Porter County, Indiana, east of Gary. It was explained that this letter was in response to an inquiry as to whether National at this time had any possible use in mind for the land.

In the letter Mr. Weir indicated that if the company built there it would erect a $20 to $25 million finishing mill and "possibly at some later date" a completely integrated steel producing plant. The finishing mill would process about 50,000 tons of slabs and coils a month from the Great Lakes Steel Corp. Detroit plant.

It was said, however, that such a project is not in the planning stage now and that it might be years before it was. Mr. Weir further said: "We bought the Chicago property in 1929 against the possibility that we might wish to build in that location at some time in the future, as has also been the case with properties acquired in other locations. But at this time we have no plans for any construction in Chicago or elsewhere except at the locations of our present operating properties."

First Packard Commemorated

Detroit—Hugh J. Ferry, executive vice-president of Packard Motor Car Co. recently unveiled a bronze plaque at Warren, Ohio, commemorating the completion of the first Packard car on Nov. 6, 1899.

Westinghouse President Sees Good Business Prospects for '50

Reports strong demand for television and radio beginning last summer.

Pittsburgh—At the Westinghouse Mid-Century Review and Forecast Forum, held in Pittsburgh recently, Gwilym Price, president of Westinghouse Electric Corp., commented on business conditions in the electrical industry, as well as general business prospects for the coming year. Led by a drop in volume of sales of consumer products, which started late in 1948, all products of the company's line experienced a decline during 1949.

An upturn, partly seasonal in nature, was anticipated on consumer products in second quarter of 1949, but didn't materialize. In June, dealer outlets and warehouses were heavily stocked, and production was cut practically all along the line. July saw the awaited upturn and the appliance business since that time has been good.

Television Demand Strong

Television and radio demand likewise has been strong since July. Except for seasonal patterns in 1950 they promise to continue strong. Labor Day saw the real turn in television equipment demand. At the present time production of such equipment is running about 30 pct behind demand.

In the past 60 days, there has been a strong upsurge in the demand for shelf goods such as meters, fractional horsepower motors and small integral standard motors. The first half of 1950 promises to extend this demand.

Backlogs of orders for heavy rotating equipment, such as mill motors, and for switchgear are heavy for at least the first half of the coming year. Demand for elevator equipment should show 1949 as good as 1948. Backlogs are shrinking, but no particular concern is felt about demand in 1950.

Overall industry bookings in 1949 were down from 15 to 20 pct from 1948, but this deficit was made up in a large part by government business, particularly on such items as radar equipment, electronic equipment, and jet engines.

Expects Less Expansion

Westinghouse, which has undergone a considerable amount of plant expansion, will likely trim back sharply on expenditures in this direction. Its $150 million expansion program is largely completed. Plant expenditures during 1950 will consist mainly of modernization and cost saving techniques and equipment. The program will be one of consolidation of existing facilities and improvement in manufacturing methods. It is anticipated that 1949 expenditures for research, which totaled about $50 million may be slightly exceeded in 1950.

Laboratory Directory Available

Washington—A directory of laboratories in the United States and Canada where mineral samples will be identified and tested is available from the Bureau of Mines.

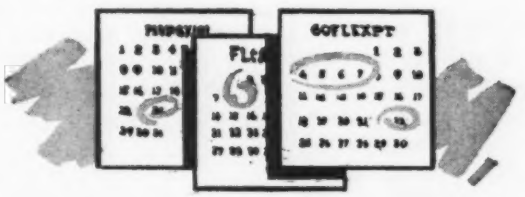
Belgium Using Marshall Plan Funds for Transportation Projects

Washington—Belgium is using nearly half its Marshall Plan loan of $51 million on projects which will reduce domestic shipping costs—not only for iron ore and other industrial imports, but for exports which are to compete in world trade.

Marshall Plan money will provide half of $25 million which will be spent on highways during the current fiscal year. Grade crossings are to be eliminated and the nation's 10 major highways are to be widened to four-lane status.

The twists and criss-crosses of the canal network are to be straightened and simplified—at a cost of $35 million over the next 5 years. Involved is the construction of at least 17 highway and six railroad bridges.

Other construction projects to speed and simplify commercial traffic involves an underground railroad link in Brussels and construction of oil docks at Antwerp, built 9 miles closer to the sea in order to handle larger tankers.



Dates to Remember

Nov. 27-Dec. 2	**American Society of Mechanical Engineers,** annual meeting, New York.
Nov. 28-Dec. 3	**Exposition of Chemical Industries,** New York.
Nov. 30-Dec. 2	**Society for Experimental Stress Analysis,** annual meeting, New York.
Dec. 4-7	**American Institute of Chemical Engineers,** national meeting, Pittsburgh.
Dec. 7-9	**National Assn. of Manufacturers,** 54th Congress of American Industry, New York.
Dec. 8-9	**American Institute of Mining Engineers,** annual conference, Pittsburgh.
Dec. 8-10	**American Institute of Mining & Metallurgical Engineers,** Electric Furnace Steel Committee, annual conference, Pittsburgh.
1950	
Jan. 9-13	**Society of Automotive Engineers,** annual meeting, Detroit.
Jan. 14	**American Electroplaters Society,** annual meeting, Chicago.
Jan. 15-19	**Associated Equipment Distributors,** annual meeting, Chicago.
Jan. 16-18	**Truck-Trailer Manufacturers Assn.,** annual convention, Edgewater Park, Miss.
Jan. 20	**Malleable Founders' Society,** semiannual meeting, Cleveland.
Jan. 22-24	**Institute of Scrap Iron & Steel, Inc.,** annual convention, Washington.

Steel Fights for Septic Tank Market

Industry seeking uniform commercial standards to protect its stake in this market . . . Tonnage involved is worth fighting for—*By JOHN B. DELANEY.*

Pittsburgh—In the absence of uniform commercial standards for septic tanks, the steel industry finds itself fighting a rear-guard action to maintain its position in this market, with a considerable tonnage of sheets at stake.

Two years ago, an estimated 30,000 tons of steel went into the manufacture of septic tanks, and the potential today, in view of the boom in rural housing, plus increased sanitation-consciousness among the farm populace, is even greater.

Two developments have served to cut the ground out from under the steel industry and responsible fabricators of steel septic tanks at a time when a new-type knock-down tank was coming into the picture to place steel in an overwhelmingly favorable competitive position with cast-in-place and precast concrete tanks.

Barred in Four States

The first blow at steel was the action of four states—Michigan, Ohio, Georgia and Florida—in ruling out steel tanks by stipulating that tanks not be subject to corrosion and decay, as contrasted to Federal Housing Administration regulations against "excessive" corrosion and decay. That one word, "excessive," keeps the door open for steel.

Secondly, the U. S. Public Health Service reported after a 2½-year study in Cincinnati that the shape and design of a septic tank apparently has little to do with its efficiency. FHA promptly advised its field offices, which are charged with regulation enforcement, that tanks of any shape may be installed in FHA-financed homes, providing minimum capacity is over 300 gallons. FHA previously had insisted that tanks be twice as long as wide.

The Public Health Service report and subsequent FHA action did two things: (1) Made it possible for FHA-financed home buyers to install comparatively makeshift steel tanks, and (2) gave a shot in the arm to back alley fabricators whose practices are giving responsible members of the industry a bad name.

What is the steel industry doing about it?

Seeks Minimum Requirements

First, in cooperation with a number of leading septic tank producers, it is getting underway a program to finance a study by the U. S. Bureau of Standards for the purpose of establishing minimum requirements for steel tanks and adoption of these standards by federal, state and local authorities charged with regulation of septic tank installations.

As a result of this study, the industry hopes to come up with a tank that will last at least 20 years.

Working along with this project are producers of bituminous coatings which virtually eliminate the problem of corrosion, both inside and out, in septic tanks of steel construction.

"Yoo hoo, Ethel. Surprise! I brought the boss home for dinner."

Market Worth Fighting For

The potential market is worth fighting for. It is estimated that something over 600,000 septic tanks will be installed in the United States this year. In 1947, approximately 150,000 tanks were of steel construction. Since the average tank is of 500-gal capacity, requiring 400-500 lb of steel per tank, about 30,000 tons of steel were consumed by this market in 1947.

Since the trend in new housing construction is toward rural areas where public sewage facilities are lacking, the market is expected to grow. On top of this, increased rural electrification has made it

Turn to Page 96

Will Install Oxygen Generators

Emmaus, Pa.—Granite City Steel Co., Granite City, Ill., has concluded arrangements for the installation of Air Products, Inc. oxygen generators, according to Leonard P. Pool, Air Products president.

N. P. Veeder, vice-president in charge of operations of Granite City, said that the generators are "the most modern and economical means of supplying the mill's oxygen requirements." He also stated that his company is working on a process which will use the generators by-product, nitrogen, in certain steelmaking operations.

Offers Practice Foundry Course

Chicago—Practice demonstration courses in molding, core making, melting and pouring, cleaning of castings and inspection of castings, will be given by the Chicago chapter of the American Foundrymen's Society. These demonstrations will be made by men thoroughly experienced in the particular subject and demonstrations will be given the second and fourth Monday evenings of the months starting with January and continuing through March.

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Financing Plan Revealed for New England Steel Mill

Boston — New England's new steel mill will be a New England enterprise, John E. Kelly, consultant to the New England Council's Steel Committee, stated here at the concluding session of the 25th New England Conference.

"The New England mill would not be a subsidiary of a midwest steelmaker, although it would be operated by such a concern having a financial interest in it," Mr. Kelly said.

In his address, Mr. Kelly revealed for the first time financial and other arrangements which are in the process of being completed. An organizing corporation is planned as the joint venture of the major steel company and New Englanders, Mr. Kelly said. "The steel company would provide part of the capital and lend an executive to serve as president, while a majority of the directors would represent New England."

Will Supply Needed Money

Mr. Kelly declared that the committee had "evolved a plan to supply the needed money at a rate cheaper than that invested in any known American steel mill, yet providing an attractive return to investors." Mr. Kelly outlined the plan as follows:

The plan calls for state legislation setting up a steel plant authority, empowered to issue long-term bonds. These, in the opinion of counsel, will be tax exempt and legal for investment by trusts, executors, estates, banks, insurance companies and other institutions. Such features should provide the authority's bonds with a ready market.

Federal lending agencies might underwrite the initial offering of bonds, but their participation would be limited to the period during which the authority's obligations would be spreading among private investors.

CHRONOLOGY OF 1949 STEEL STRIKE

June 15, 1949—Beginning of collective bargaining between U. S. Steel Corp. and United Steelworkers of America on union's request for wage increase, pensions and social insurance.

July 6, 1949 — Negotiations broken off when Corporation rejected union demand for wage increase and stated that pensions were not negotiable under terms of the contract. The company offered to negotiate a contributory social insurance program.

July 12, 1949—Union International Executive Board and Wage Policy Committee authorized a strike. President Truman proposes fact-finding board. U. S. Steel rejects proposal, since it ignored the Taft-Hartley Act.

July 13, 1949 — Union accepts President's proposal, but warns it will strike any company that refuses to go along. J. & L. and several other companies acceded to the President's request and agreed to continue operations 60 days beyond the strike deadline of 12:01 a.m. July 16. Mr. Truman again appealed to U. S. Steel, Bethlehem and Republic, asking them to reconsider their position.

July 14, 1949 — Several more steel companies went along with the President. U. S. Steel asked Mr. Truman to modify his plan and take away the fact-finding board's power of recommendation, since the Taft-Hartley Act provides no such authority. The President clung to his original proposal.

July 15, 1949—At 2 p.m. U. S. Steel agreed to appear before the fact-finding board after receiving assurance that any recommendations by the board would not be binding on either party to the dispute. Bethlehem Steel and Republic earlier had agreed to go along. The union rescinded the strike call, but set a new deadline of Sept. 14.

July 28, 1949 — Fact-finding panel opened hearings in New York.

Sept. 10, 1949—Fact-finding report denying union's request for wage increase and recommending company - financed pension and insurance programs costing 6 and 4 cents per hour, respectively, delivered to President Truman. Strike truce extended to Sept. 25.

Sept. 21, 1949—President Truman asks for extension of strike deadline to Oct. 1. Companies and union agree.

Sept. 23, 1949—U. S. Steel and union reopen key bargaining sessions.

Sept. 30, 1949—With negotiations stalemated on union's demand that fact-finding board's recommendations be accepted as a pre-requisite to working out of pension and insurance programs, USW President Philip Murray orders strike.

Oct. 1, 1949—Strike begins at 12:01 a.m.

Oct. 31, 1949—Bethlehem Steel Corp. signs agreement with USW ending strike at Bethlehem plants Nov. 1. Agreement provided for company-financed pension program and company - employee - financed social insurance benefits, both to become effective Jan. 1, 1950. (See IRON AGE Nov. 3, '49, p. 116 for details).

Nov. 8, 1949—Jones & Laughlin Steel Corp., Republic and Youngstown Sheet & Tube sign agreements based on the Bethlehem "pattern."

Nov. 11, 1949—U. S. Steel Corp. and Inland Steel Co. sign up. To all intents and purposes the strike is over, excepting for a handful of companies, most of whom agreed to the union's demands within the next week.

Construction Steel Awards

Fabricated steel awards this week included the following:

1200 Tons, Blackwell, Okla., sinter building for the American Ore Reclamation Co., to Mississippi Valley Structural Steel Co., Chicago.
1000 Tons, Pixtown, S. D., intake gates through U. S. Engineers Office, Omaha, to Northeastern Boiler & Welding Co.
900 Tons, Frederick, Md., Maryland State Roads Commission, general contract to Conduit & Foundation Co., Philadelphia.
800 Tons, West Point, Pa., Sharp & Dohme Co., to Bethlehem Fabricators, Inc., Bethlehem.
500 Tons, Westmoreland County, Pa., Pennsylvania Turnpike Commission, Latrobe Construction Co., Latrobe, Pa., low bidder on construction contract.
220 Tons, Chicago, building for Len C. Smith Mfg. Co., to Wendnagle & Co., Chicago.
140 Tons, Garrett, Ind., building for the Hubbard Spool Co., to J. T. Ryerson & Son, Chicago.
125 Tons, Haddonfield, N. J., Bell Telephone Co., to Bethlehem Steel Co., Bethlehem.
110 Tons, Henry County, Ind., bridge section 3134 through J. S. Sweet Construction Co., to Pan American Bridge Co., New Castle, Ind.

Fabricated steel inquiries this week included the following:

1130 Tons, Allegheny County, Pa., 6 bridges and approaches between Pittsburgh and Forest Hills Borough, Pa. Dept. of Highways, bids to Dec. 21.
1100 Tons, Pittsburgh, Pennsylvania Dept. of Highways, bridges, due Dec. 21.
1000 Tons, Ft. Wayne, Ind., coliseum, bids due Dec. 14.
1000 Tons, Langley Field, Va., dynamics laboratory, due Dec. 20.
600 Tons, Fairmount, W. Va., warehouse for Owens Illinois Glass Co., due Nov. 30.
400 Tons, Cambridge and Boston, new Eliot Bridge over Charles River.
345 Tons, Derby, Conn. Four projects including two rolled beam bridges and six piers for viaduct on Shelton - Derby - Ansonia, Conn., Expressway. Bids due Nov. 28. M. B. Pearce, New Haven, Conn., resident engineer.
320 Tons, Waterloo, Iowa, bridge section UE62-6.
150 Tons, Alice, Kans., spillway through U. S. B. of R. specification 2831, bids due Dec. 8.
135 Tons, Erie County, Pa., widening of existing pavement and construction of 2 I beam bridges, Erie, Pa., Pennsylvania Dept. of Highways, bids to Dec. 9.
120 Tons, Bloomington, Ill., National Guard Bldg., bids due Nov. 25.
120 Tons, East St. Louis, Mo., National Guard Bldg., bids due Nov. 25.
100 Tons, Paris, Ill., National Guard Bldg., bids due Nov. 25.

Reinforcing bar awards this week included the following:

400 Tons, Quincy, Mass., construction of Blue Hills Reservoir, Metropolitan District Commission project. Gil Wyner, Malden, low bidder.
185 Tons, Alburg and North Hero, Vt., continuous plate girder bridge and approaches, Marson Construction Co., Somerville, low bidder.
150 Tons, Sheridan, Ill., addition to state reformatory, through Mayfair Construction Co., Chicago, to Truscon Steel Co., Youngstown.
125 Tons, Boston, construction of superstructure of building and appurtenances, Nut Island Sewerage Treatment plant. Thomas O'Connor & Co., contractors, Cambridge, low bidder.
120 Tons, Galesburg, Ill., building for Knox College, Federal Construction Co., Chicago, low bidder.

Reinforcing bar inquiries this week included the following:

970 Tons, Friant, Calif., canal lining and structures, Friant-Kern Canal, Bureau of Reclamation, Friant, Spec. 2834, bids to Dec. 13.
600 Tons, Newport, Ky., flood wall.
585 Tons, Allegheny County, Pa. Six bridges and approaches between Pittsburgh and Forest Hills Borough, Pa. Dept. of Highways, bids to Dec. 21.
465 Tons, Hammond, Ind., highway bridge.
215 Tons, four projects on Shelton-Derby-Ansonia, Conn., Expressway. M. B. Pearce, New Haven, Conn., resident engineer.
195 Tons, Colombus, Ind., highway bridge.
165 Tons, Cambridge and Boston, new Eliot Bridge over Charles River.
110 Tons, Lewis Co., Ore., bridges and viaducts, Stevens Canyon Highway, Bureau of Public Roads, Portland, bids to Nov. 29.

National Tube's New Lorain Facilities Near Completion

Lorain, Ohio — National Tube Co. has virtually completed construction of its new steel and pipemaking facilities here, according to president John E. Goble. The most unusual unit in the program is the world's first continuous pipe mill which will make 2½ to 4-in. diam seamless pipe. It is rated at 18,000 tons capacity per month.

Other new facilities include an entirely new bessemer steel plant, new blooming, bar and billet mills, 177 new byproduct coke ovens and a warehouse for pipe storage under roof. The new bessemer plant brings National's Lorain facilities to a rated annual capacity of approximately 2,250,000 tons, a 366,000-ton increase. There are three active 25-ton all-welded converters and a standby.

All of National Tube's buttweld pipe production has been concentrated at Lorain and new galvanizing facilities have been installed there. Two new Hulett ore unloaders have replaced two smaller unloaders and the ore dock was rebuilt.

CUSTOM BUILT: This is one of two huge hydraulic cylinders built by Logansport Machine Co., Logansport, Ind., for Reynolds Metals Co. Reynolds officials say the cylinders were ordered for use in new casting machines for producing heavier billets. The two cylinders are believed to be the largest of their type ever built.

Power Shortage Reduces Western Aluminum Output

Spokane—The ubiquitous power problem which has governed the production of aluminum in the Pacific Northwest has asserted itself through the layoff of about 150 men at the Mead aluminum reduction plant of Kaiser Aluminum & Chemical Corp., near here. A reduction of 27,800 kw was recently ordered by the Bonneville Power Administration because of a "lack of water." This reduction has taken one potline out of production which will mean the loss of about 1500 tons per month.

Fortuitously, based on past experience, Kaiser Aluminum had stockpiled enough pig to maintain capacity operations of its Trentwood rolling mill throughout the winter months.

Orders for Kaiser aluminum for November set an all-time record and the total volume to be shipped this month will be the greatest for any one month in the company's history.

Aluminum foil production during October at the plant at Permanente, Calif., was reported as being 2½ times greater than the average for the June-to-August quarter.

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David Ayr

Richard E. LeBlond

Frederick S. Blackall, Jr.

Jerome A. Raterman

R. W. Glasner

Tool Builders Prepare for the Future by Discussing Their Problems

White Sulphur Springs, W. Va.—At the 48th annual meeting of the National Machine Tool Builders' Assn., held at the Greenbrier Hotel, Nov. 16 to 18, David Ayr, president and general manager of Hendey Machine Co., Torrington, Conn., was elected president of the National Machine Tool Builders' Assn.

Richard E. LeBlond, president of R. K. LeBlond Machine Tool Co., Cincinnati, was elected first vice-president; Frederick S. Blackall, Jr., president and treasurer of Taft-Peirce Mfg. Co., Woonsocket, R. I., was elected second vice-president; and Jerome A. Raterman, president of Monarch Machine Tool Co., Sidney, Ohio, was elected treasurer.

Elected to the board of directors of NMTBA were Mr. Raterman, Mr. Blackall, and R. W. Glasner, president of the Clearing Machine Corp., Chicago.

Compares Tool Investments

In a paper entitled, "Developing the Replacement Market," L. W. Scott Alter, president of American Tools Works Co., Cincinnati, enlarged on the theme of applying the same yardsticks to machine tool investments as are applied to investments in stocks and bonds. The idea, outlined in THE IRON AGE, Sept. 22, 1949, p. 102, provides a basis of comparing production machinery with investments in securities. One of the primary factors in such a system is the regular appraisal of machine tool equipment by second hand dealers in order that a fair evaluation of equipment will be certain. Such a program is being urged as an attempt to urge the withdrawal of equipment in a well-planned, rational method to assure that industry will have at all times adeqate modern, high-production machinery in its plants.

Foreign Sales Ratio Holds Up

Government activities that affect the machine tool industry were reported by A. G. Bryant, chairman of NMTBA Government Relations Committee. Important to the industry are current activities dealing with renegotiation. While at the present time, renegotiation of government contracts doesn't pose much of a problem, at this time regulations are being considered and precedent and principle are being established.

Mr. Bryant pointed out that foreign sales have accounted for about 29 to 30 pct of total sales, with the ratio holding quite steady despite a decline in total sales. With a more direct effort to build up machine tool industries in Europe, the association has found that special or very large machines have made up the bulk of foreign sales. The military aid program to western Europe will result in about $30 million of machine tool business, which is expected to be placed in normal channels. The business will have to be created and originated by American representatives in Europe.

The subject of modifications in depreciation methods for tax purposes was discussed by Mr. Bryant, and the results of a survey of machine tool users were reported. The survey made apparent the need for a new approach to attain the desired changes in depreciation methods, involving selling the users of machinery on the idea.

Guest speaker at the annual dinner was Dr. Cornelis W. de Kiewet, acting president of Cornell University. His discussion dealt with industrialization as a means of developing democracy and halting totalitarianism. Active individual creative effort, he pointed out, is necessary to provide society the benefits of research and invention. Such creative effort is stifled under a regimented economy, which inevitably results in stagnation of productivity and self-perpetuation of bureaucracy.

Operates New Coke Ovens

Cleveland—First coke was pushed from a new battery of 38 coke ovens at Republic Steel Corp's Youngstown district steel plant recently. The new battery replaces one of four older batteries.

Construction of a second battery of 65 ovens is already under way. It will replace two of the remaining three old batteries.

Republic recently completed construction of a new battery of 40 coke ovens at its Warren district plant and a second battery of 40 ovens is under construction. These two new batteries replaced 64 old ovens.

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

"The Scales Of Bargaining Power"

EVERYONE is happy to see the steel workers back at their jobs, the mills pouring out their ferrous flood, and hungry customers again fulfilling their commitments. It is also gratifying to know that management, with the weapons at hand and the odds against them, put up so valiant a fight.

Yet the return of peace in the industry leaves somber reflections. This was not an equal fight. The final terms were dictated and not negotiated. They represented capitulation under conditions that were barely face-saving for management. In the book of labor, this is marked up as another "unconditional surrender."

The truth is that labor and the employer do not face each other across the bargaining table as equals. The union may openly mobilize its forces and concentrate them for action against a specific employer. It presents a united front. Its leaders dispose of monopoly power subject to wholly inadequate restraints.

The right of industry organization for bargaining purposes or even for consultation is denied to management. It must fight along the front as separate detachments without the benefit of liaison or united command. These isolated centers of defense may not receive succor from the outside.

Management did not attempt plant operation during the strike, even though substantial portions of the working forces might have reported. It knew that government, the legally constituted umpire, though possessed of ample power, would not use it to protect its property or the persons of employees who sought to work. Labor still enjoys the sovereign right of violence which makes imprudent any attempted operation of plant during a strike.

The bargaining between great economic adversaries partakes somewhat of the character of warfare. When the forces of one side may concentrate, select the field of battle, take the initiative, and use any weapon in the arsenal of attack, while the other is restricted in the disposition of its forces, limited in the choice of strategy, initiative and weapons, the outcome can hardly be in doubt.

This is unfortunate, not because it involves the anguish and defeat of management or loss to stockholders, but because it means the ultimate domination of the community by a special interest. It means that the sole criterion of proper public policy will be the pleasure of professional labor leaders.

There are no limits in logic or morals to the demands of labor. And only inadequate deterrents in the field of economics. What is a fair wage for labor? How much of the total cake should go to the worker, to management, to the owner? These are questions which are being settled by the sword of labor power rather than by reasonable discussion between equals. Only by its resistance to the high labor costs represented in the price of the final product can the public express its displeasure and fear. Only by its failure to buy the securities of steel companies or pay a fair price for them can the open market say what it thinks about labor monopoly. These are mild sanctions which do not penetrate the arrogance or limit the power of the labor leader.

There was a time when the employer carried a weight of power at the bargaining table so overwhelming that it became a menace to the public interest. Today the scales of bargaining are just as badly out of balance, with all the excess weight on the side of labor. The settlement of the steel strike is an object example.

Evaluates Plating Room Wastes

New York—"Disposal of Plating Room Wastes" is the subject of a research project being sponsored by the American Electroplaters' Society. The object of this project is to evaluate known methods for treatment of plating room wastes and to attempt to develop new methods of treatment.

The two factors being given greatest consideration are the efficiency of the treatment and its cost. The information thus obtained will enable engineers to design equipment for specific installations and to keep the cost of the equipment at a minimum.

Septic Tank Market

Continued from Page 92

possible for farm communities to install modern plumbing and septic tanks—and the farm population is doing it.

Cost Savings Noted

With the development of a knockdown tank by Harry H. Hendon, of the Birmingham, Ala., engineering firm of Polk, Powell & Hendon, the steel tank producers were in a better position than ever to compete against other types of tanks. The knockdown tank has these advantages: (1) Fabricated and shipped in two sections, it lends itself to production-line technique, lowering the unit cost by $2 to $5; (2) it can be shipped as Class Six freight, compared with Class One for units built completely in the plant, which means a freight saving of 40 pct and makes possible shipment of a 500-gal tank 600 miles for less than the 100-mile freight charge for conventional type tanks, and (3) ease of handling, storage and installation on the job.

It is estimated that the knockdown tanks can be delivered at $45.00 to $55.00, as compared with $70.00 to $200.00 for concrete tanks of equal capacity.

Resume Your Reading on Page 92

UNIVERSITY OF MICHIGAN LIBRARIES

Briefs and Bulletins

world market—American tinplate and cold-rolled sheets probably won't be seriouly challenged from the standpoint of production, cost and quality in the near future. Nevertheless, European producers are eyeing this market covetously. The Belgian firm, FERBLATIL (Compagnie des Fers Blancs et Toles a Froid), is building a cold-rolling mill which is expected to begin operating about the middle of 1950. Electrolytic process of tinning has been adopted to follow American practice. A French company, Forges de Chatillon, Commentry and Neuves-Maisons will build a cold-rolling mill of more than 100,000 tons annual capacity at Isbergues works. The thin sheets will be used for auto bodies. The company is already the leading French producer of sheets for the auto industry.

kropp forge fire—A $200,000 blaze swept the Kropp Forge Co., Chicago, Nov. 19. The fire was fed by spilled oil from five storage tanks and two Chicago fire companies were called to assist the Cicero firemen. The fire destroyed the new heat treating facilities that Kropp installed recently but operations at the forge shop and in the rest of the plant were not affected. The company plans to farm out its heat treating until the damage can be repaired.

warehouse deliveries—One Chicago warehouse which was struck, closed with good inventories on most items. During the strike they continued to accept many orders. Today the best promise out of this house is 2-weeks' delivery. Generally a warehouse can deliver the same day or the next day. Thus, just filling orders out of stock has been slowed down because of huge demand and the fact that all customers want their steel now.

stainless—While stainless demand remains fairly strong, producers are fighting tooth and nail for business. Many never went over to a flat f.o.b. mill basis, preferring to consider each possible order on its own merits. One of the biggest stainless producers officially notified customers in certain districts that it would equalize freight to get business, effective Nov. 16.

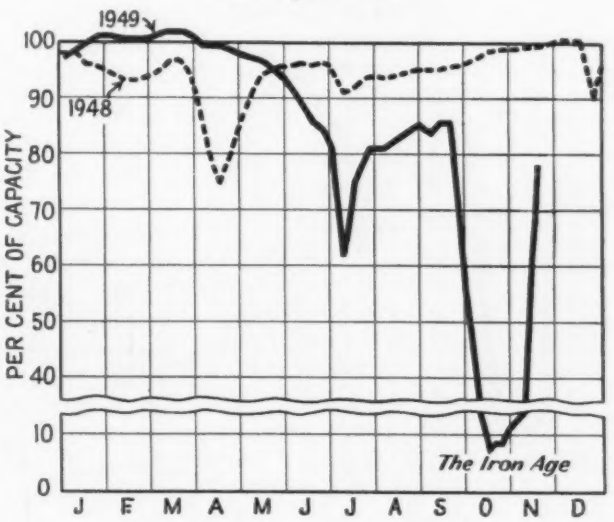
acme signs—Acme Steel Co. ended their 45-day strike Nov. 20 when union and company officials signed an agreement patterned on the Bethlehem Steel settlement. G. T. Avery, vice-president in charge of operations at Acme's Riverdale plant, estimated that full production would be underway by Wednesday, Nov. 23.

funds granted—The Chicago district office, U. S. Engineers, was recently granted funds to finish a study and submit a report on a harbor project in Burns Ditch, which is just east of Gary in Porter County, Ind. This report will be completed by May. Aside from possible long-range interest of National Steel Corp., which owns 800 acres there, Indiana coal operators want such a harbor as an outlet for their downstate coal production. Funds came as a surprise to those who thought the project had been shelved.

pipe plant—The American Steel & Tube Corp. has made a bid of $1,800,000 cash, or $2,025,000 on terms for a government-owned steel castings plant at St. Louis. The plant was built during the war at a cost of $12,935,000. If the bid is accepted, the concern will manufacture oil and gas pipeline, according to company officials.

freight cars—The freight car business received a boost when Southern Pacific revealed plans to acquire 3100 new freight cars and give 900 boxcars a general overhauling. The new freight cars will consist of 3000 steel boxcars and 100 drop-end gondola cars.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
November 13	47.0*	45.5*	44.5*	83.0	74.0*	101.0	80.0	18.0	64.0*	35.0	46.0	91.5	61.0	61.5
November 20	78.0	75.0	74.5	83.0	89.0	101.0	104.0	49.0	98.0	59.5	48.0	87.0	97.5	78.5

* Revised.

Nonferrous METALS OUTLOOK

Market Activities

by John Anthony

Further weakness in the metal markets . . . London Metal Exchange trading brings down the price of tin to 85¢ . . . Lead drops to 12.00¢ . . . Smelter strike ends.

New York — Further weakness appeared in several markets last week, reversing the strong trend in metals seen early this month.

The first full week of operation of the London Metal Exchange established a sharp downtrend in spot and future tin prices. On Nov. 15, the first day of operation, sales for immediate shipment opened at the equivalent of 90⅜¢ per lb and closed at 90.00¢. Trading on succeeding days registered further declines.

The settlement price of the British Ministry of Supply reflected the rapidly dropping trading level. This price was 91¢ on Nov. 16, 90¢ on Nov. 17, 87.50¢ on Nov. 18 and 87.25¢ on Nov. 21. This is the price at which the buyer may select any day for settlement of a purchase contract up to the tenth day after the arrival of the vessel.

Tin Price At 85¢

Demand for tin in the face of the declining market is still very cautious. Futures are being quoted well below the spot market, as low as 75¢ per lb.

On Nov. 21, the RFC announced its new tin price at 85.00¢ per lb for Grade A. This action followed several days of withdrawal from the market. The previous price had been 95.00¢ a lb.

The lead market was still suffering from the effects of heavy imports of foreign metal at a time when seasonal demand by the replacement battery industry is low. On Nov. 21 the price was reduced by ½¢ to a New York price of 12.00¢. This development follows a long series of small price reduction which began in the latter part of September, bringing down the price from 15⅛¢. Contrary to recent experience, the reduction was followed immediately by the major producer.

Market observers believe that the producers will make an effort to stabilize the market on this level. But there is every evidence that the heavy imports of foreign lead will continue in an effort to get U. S. dollars. Lead importers are paying a duty of 1 1/16¢ per lb and underselling the domestic market. If this trade continues, there must come a time when lead imports will become unprofitable. But in the meantime, it is expected that the urgency of the need for dollars will place priority on imports of the metal to the U. S. market.

Bunker Hill Strike Ends

The strike at the Bunker Hill and Sullivan smelter ended last week with the company's agreement to a modest increase in the contribution to the existing pension plan. Another gain for labor was the establishment of a six-day work week. The smelter had been on strike since Aug. 20, with a loss of 5000 tons of corroding lead a month and 70 pct of the zinc production rate of 4000 tons of Special High Grade a month.

Some of the mines feeding the smelter are still on strike and it may be late in December, if then, until the smelter goes into full production.

NONFERROUS METALS PRICES

	Nov. 16	Nov. 17	Nov. 18	Nov. 19	Nov. 21	Nov. 22
Copper, electro, Conn.	18.50	18.50	18.50	18.50	18.50	18.50
Copper, Lake, Conn.	18.625	18.625	18.625	18.625	18.625	18.625
Tin, Straits, New York	91.00	90.00	90.00	87.50	85.00	85.00
Zinc, East St. Louis	9.75	9.75	9.75	9.75	9.75	9.75
Lead, St. Louis	12.30	12.30	12.30	12.30	11.80	11.80

Note: Quotations are going prices.

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Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.3¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.5¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 34.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 24¢ to 30.5¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 26.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅝ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 33.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheets and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2¼ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	32.18	....	31.78
Copper, h-r	....	28.03	....
Copper, drawn	....	29.28	....
Low brass	30.12	29.81	33.03*
Yellow brass	28.69	28.38	31.70*
Red brass	30.60	30.29	33.51*
Naval brass	33.51	27.57	28.82
Leaded brass	....	23.19	27.22
Com'l bronze	31.61	31.30	34.27*
Manganese bronze	37.01	30.92	32.42
Phosphor bronze	50.90	51.15	....
Muntz metal	31.58	27.14	28.39
Everdur, Herculoy, Olympic, etc.	37.19	36.14	....
Nickel silver, 10 pct	39.66	41.87	46.80
Arch. bronze	....	....	27.22

*Seamless tubing.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	32.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	18.50
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	12.55
Lead, New York	12.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask f.o.b. New York	$72 to $75
Nickel, electro, f.o.b. New York	42.97
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	73.25
Tin, New York	85.00
Zinc, East St. Louis	9.75
Zinc, New York	10.47
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	17.25-18.25
No. 120	16.75-17.75
No. 123	16.25-17.25
80-10-10 ingot	
No. 305	22.75
No. 315	19.75
88-10-2 ingot	
No. 210	29.25
No. 215	26.25
No. 245	18.75-21.50
Yellow ingot	
No. 405	14.25-16.00
Manganese bronze	
No. 421	20.75

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	18.75-19.25
0.60 copper, max.	18.25-18.75
Piston alloys (No. 122 type)	16.50-17.00
No. 12 alum. (No. 2 grade)	16.25-16.75
108 alloy	16.75-17.50
195 alloy	17.50-18.00
13 alloy	18.50-19.00
AXS-679	16.75-17.50
5% Ti, Aluminum, f.o.b., Eddystone, Pa.	
Low copper	31.00
2% copper	28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	17.75-18.50
Grade 2—92-95%	16.75-17.50
Grade 3—90-92%	15.75-16.50
Grade 4—85-90%	15.25-15.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	34⅝
Electrodeposited	28⅞
Rolled, oval, straight, delivered	33.34
Ball anodes	32⅞
Brass, 80-20	
Cast, oval, 15 in. or longer	30⅝
Zinc, oval, 99.886, f.o.b. Detroit	17¼
Ball anodes	16¼
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	45.00
Copper sulfate, 99.5 crystals, bbl.	11.10
Nickel salts, single or double, 4-100 lb bags, frt allowed	18.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbl.	7.75

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	15½	14¾
Yellow brass	12½	11⅝
Red brass	14	13¼
Commercial bronze	14¼	13½
Manganese bronze	12	11¼
Leaded brass rod ends	12¼	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	15.00
No. 2 copper wire	14.00
Light copper	13.00
Refinery brass	13.00*
Radiators	9.25-9.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	15.00
No. 2 copper wire	14.00
Light copper	13.00
No. 1 composition	13.00
No. 1 comp. turnings	12.50
Rolled brass	10.50
Brass pipe	11.50
Radiators	9.50-10.00
Heavy yellow brass	10.00
Aluminum	
Mixed old cast	10.50-11.00
Mixed old clips	10.50-11.00
Mixed turnings, dry	8.50- 9.00
Pots and pans	10.50-11.00
Low copper	11.50-12.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	13¼—13½
No. 2 heavy copper and wire	12¼—12½
Light copper	11¼—11½
Auto radiators (unsweated)	8¼— 8½
No. 1 composition	11 —11¼
No. 1 composition turnings	10½—10¾
Clean red car boxes	9¼— 9½
Cocks and faucets	9¼— 9½
Mixed heavy yellow brass	7¼— 7½
Old rolled brass	8½— 8¾
Brass pipe	9¾—10
New soft brass clippings	10½—11
Brass rod ends	9¾—10
No. 1 brass rod turnings	9½— 9¾

Aluminum

Alum. pistons and struts	5 — 5½
Aluminum crankcases	8 — 8½
2S aluminum clippings	11 —11½
Old sheet and utensils	8 — 8½
Borings and turnings	4
Misc. cast aluminum	8 — 8½
Dural clips (24S)	8 — 8½

Zinc

New zinc clippings	6 — 6½
Old zinc	4 — 4½
Zinc routings	2½— 3
Old die cast scrap	3¼— 3½

Nickel and Monel

Pure nickel clippings	21 —23
Clean nickel turnings	14 —15
Nickel anodes	20 —22
Nickel rod ends	20 —22
New Monel clippings	12 —14
Clean Monel turnings	8 — 9
Old sheet Monel	10 —12
Old Monel castings	9 —10
Inconel clippings	11 —13
Nickel silver clippings, mixed	8 —10
Nickel silver turnings, mixed	6 — 7

Lead

Soft scrap, lead	9 — 9¼
Battery plates (dry)	4¼— 4½

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	63 —65
No. 1 pewter	38 —40
No. 1 auto babbitt	35 —37
Mixed common babbitt	9 — 9¼
Solder joints	11½—12
Siphon tops	40 —42
Small foundry type	11½—12
Monotype	10½—11
Lino. and stereotype	9¾—10¼
Electrotype	8¼— 8½
New type shell cuttings	11½—11¾
Hand picked type shells	4 — 4½
Lino. and stereo. dross	4¾— 5
Electro. dross	2¾— 3

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MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Prices Firm With Little Mill Buying

The market undertone remains firm and the activity indicates an attempt to consolidate gains of the previous week. Up until now the mills have generally shown a lack of interest in making new commitments for large tonnages. Apparently, adequate mill inventories and the realization that there is sufficient stocks of yard material has permitted mill buyers to become more careful in making their commitments. Trade sources indicated that prices are approaching a point of stabilization and any future increases will be small. The cast market remains firm with little demand in some areas. This week the top quotation of No. 1 steel was up $3.00 in Detroit; in New York it was up $2.00; in Buffalo it was up $1.50; and in Pittsburgh and Boston it was up $1.00. THE IRON AGE scrap composite was up 34¢ this week to $29.92 per gross ton.

PITTSBURGH—The market for No. 1 heavy melting steel was up $1.00 to a top of $34.00 this week. While the market continued strong, there were indications that prices were approaching a point of stabilization. Any suggestion of a runaway market was being discounted, although pressure toward higher prices was still a factor. Short turnings were up $2.00 to $26.00, and railroad specialties jumped $1.00. There was little activity in the cast grades.

CHICAGO—Limited sales were reported here at both the high and low prices of the range on No. 1 heavy melting. Some weakness was apparent because of the failure of the mills to give the green light to ship against old orders and their lack of interest in large new tonnages. Many dealers reported fewer broker offers and in cases lower offers than a week ago. Observers believe the momentary weakness will be short lived and present prices will be firm without any large increases expected in the near future.

PHILADELPHIA—A moderate tonnage of steel grades was bought last week by one consumer, but others were staying out of the market at present prices. Dealers were moving small tonnages, enough to keep them operating, but showed no inclination as yet to throw heavy inventories on the market. Dealers' buying contined to be highly competitive. With one consumer expected to be inoperative for some time to come and no indication of buying in the east by a major consumer, the present heavy stocks may be more than sufficient to fill local requirements without building up the price. The cast market is still firm, although major factors were not in the market last week. There is no market for low phos, but small lots have been sold at or near quoted prices.

NEW YORK—Prices advanced here in the steelmaking grades as mill demand began to show improvement. No. 1 steel was up to $2.00 to $23.00—$24.00. Brokers reported that the dealers were selling, but not the tonnage that they would like to buy. Yard material has been coming in slowly and this situation will not improve during the coming months. The cast grades remain firm with no improvement in demand.

DETROIT—Although there has been only limited mill buying here speculative interest in the local market is still very strong. Meanwhile, dealers are confident prices will reach higher levels. The result is a near stalemate in which few tons of scrap change hands but sales that are made are bringing prices at the highest level in several months. Sale of a substantial tonnage of low phos at a price equivalent to $34.00 Detroit has been reported. Meanwhile, prices of cast grades are also skyrocketing although buying is reported light.

CLEVELAND—Despite bad weather which normally is not a weakening factor, the market was a little easier here and in the Valley this week based on firm offers by brokers to sell tonnage somewhat under last week's prices. At the moment the market here is without a recent parallel. There are many large tonnages around which make it easy for major consumers to buy very quietly. Brokers are not panicky as mills scrap requirements are not really under way as yet and while mills don't want to start using inventory this time of year, some of the dealers are beginning to unload.

BOSTON—Prices advanced here to the highest levels in months. No. 1 steel is being bought for as high as $22.50, the best price in months, and scrap is moving somewhat more near normal. The trade is happier than they have been in some time. There is no change at all in the cast situation, both prices and activity being almost stagnant.

BUFFALO—Prices advanced up to $2.00 a ton on leading steelmaking grades of scrap during the week. About 20,000 tons was involved in transactions between three leading dealers and one of the chief mill consumers. Turnings were not included in the new business. The turnings market was about the same here. Cast continues to move within prevailing ranges. Approximately 2500 tons of scrap arrived during the week on barge via the canal.

CINCINNATI—Prices were unchanged here in a confusing market. Dealers are loosening up but only on limited tonnages in an effort to test the market. One tonnage was offered early this week at $2.00 over quoted prices with no takers. On the other hand brokers covered an order for a representative tonnage for a major consumer here late last week with no difficulty. Mills are comfortable but could use additional tonnage, which raises the question of will they be willing to come in at higher prices in the immediate future.

ST. LOUIS—Steel mills in the St. Louis industrial district continue to withhold buying awaiting developments in other markets. Mills are proceeding with caution because they are uncertain as to what competition they will get for scrap from other markets. So far there has been none because some sections are either strike bound or have not gotten into action following settlement. Sheffield Steel Corp., a heavy user, is also still strike bound.

BIRMINGHAM—A tug of war is going on here with consumers resisting higher prices and scrap holders reluctant to sell in the expectation that prices will advance. Supplies are plentiful generally. With freight rates at their present level, little material is moving out of this district to northern mills.

AFTERMATH OF THE STEEL STRIKE

DEPENDABLE DAN
OUR CUSTOMERS' MAN

OUR first concern, during the steel strike, was to help our customers keep their plants running. So with everything going out and practically nothing coming in, we all but exhausted our mill and warehouse inventories.

It may take a little time to restore our stocks. Meanwhile you may find us short of some gauges and sizes in some grades and finishes. Should that happen, please try us again. Chances are we will have what you want the next time.

Keep us informed of your requirements. We will do our utmost to *job-fit* available material to your specific needs, and always at our normally established prices.

RELIANCE *Job-Fitted* PRODUCTS AND SERVICES

COLD ROLLED STRIP STEEL*

Coils . . . Cut Lengths . . . All Tempers . . . Slit, Sheared, Deburred and Round Edge
From WAREHOUSE and MILL DEPOT STOCKS, or DIRECT-FROM-MILL

**Detroit Steel Strip is Strip Steel in Name and in Fact*

SHEETS

Cold Rolled . . . Hot Rolled . . . Hot Rolled Pickled . . . Long Terne . . . Galvanized
Standard or production sizes or cut to actual working dimensions
PRIMES or COST-SAVING SECONDS **
From WAREHOUSE STOCKS

*** Reliance Job-Fitting Methods apply to seconds as well as primes*

DETROIT STEEL CORPORATION
PRODUCERS OF
COLD ROLLED STRIP STEEL
DETROIT 9, MICHIGAN
NEW HAVEN 7, CONNECTICUT

RELIANCE STEEL DIVISION
Processors and Distributors JOB-FITTED Sheet and Strip Steel
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DETROIT PLANT, 13770 Joy Road, WEbster 3-5866, Detroit 28, Mich.
EASTERN PLANT, State & Edmund Sts. (Hamden), New Haven 7-5781, New Haven 7, Conn.
MIDWEST PLANT, 1601 South Wolcott Ave., CAnal 6-2442, Chicago 8, Ill.
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INDIANAPOLIS 4, IND., 1408 Fletcher Trust Bldg., FRanklin 3429
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NEW YORK 19, N. Y., 250 West 57th St., COlumbus 5-4870
ST. LOUIS 8, MO., 4053 Lindell Blvd., LUcas 4558
TOLEDO 4, OHIO, 2114 Ohio Bldg., GArfield 0384
WORCESTER 8, MASS., 339 Main St., WOrcester 5-9686

UNIVERSITY OF MICHIGAN LIBRARIES

Scrap IRON & STEEL Prices

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$33.50 to $34.00
No. 2 hvy. melting	30.00 to 30.50
No. 1 bundles	33.50 to 34.00
No. 2 bundles	27.00 to 27.50
Machine shop turn.	22.50 to 23.00
Mixed bor. and ms. turns.	22.50 to 23.00
Shoveling turnings	25.50 to 26.00
Cast iron borings	24.50 to 25.00
Low phos. plate	35.00 to 35.50
Heavy turnings	25.00 to 26.00
No. 1 RR. hvy. melting	34.50 to 35.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast	39.00 to 40.00
Mixed yard cast	37.00 to 38.00
Heavy breakable cast	29.00 to 30.00
Malleable	33.00 to 34.00

Chicago

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 factory bundles	30.00 to 31.00
No. 1 dealers' bundles	28.00 to 29.00
No. 2 dealers' bundles	25.00 to 26.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	19.00 to 20.00
Low phos. forge crops	35.00 to 36.00
Low phos. plate	33.00 to 34.00
No. 1 RR. hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	47.00 to 48.00
Rails 2 ft and under	45.00 to 46.00
Locomotive tires, cut	42.00 to 43.00
Cut bolsters & side frames	34.00 to 35.00
Angles and splice bars	39.00 to 40.00
RR. steel car axles	48.00 to 49.00
No. 3 steel wheels	36.00 to 37.00
RR. couples and knuckles	37.00 to 38.00
No. 1 machinery cast	44.00 to 45.00
No. 1 agricul. cast	43.00 to 44.00
Heavy breakable cast	39.00 to 40.00
RR. grate bars	34.00 to 35.00
Cast iron brake shoes	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Malleable	39.00 to 40.00

Philadelphia

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	25.00 to 26.00
No. 2 bundles	22.50 to 23.50
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	16.50 to 17.50
Low phos. punchings, plate	27.00 to 28.00
Low phos. 5 ft and under	26.00 to 26.50
Low phos. bundles	26.00 to 26.50
Hvy. axle forge turn.	25.00 to 26.00
Clean cast chem. borings	27.00 to 28.00
RR. steel wheels	29.00 to 29.50
RR. spring steel	29.00 to 29.50
Rails 18 in. and under	38.00 to 40.00
No. 1 machinery cast	37.00 to 39.00
Mixed yard cast	35.00 to 36.00
Heavy breakable cast	34.00 to 35.00
Cast iron carwheels	36.00 to 37.00
Malleable	34.00 to 35.00

Cleveland

No. 1 hvy. melting	$33.00 to $33.50
No. 2 hvy. melting	28.00 to 28.50
No. 1 busheling	33.00 to 33.50
No. 1 bundles	33.00 to 33.50
No. 2 bundles	27.00 to 27.50
Machine shop turn.	24.00 to 24.50
Mixed bor. and turn.	22.50 to 23.00
Shoveling turnings	22.50 to 23.00
Cast iron borings	22.50 to 23.00
Low phos. 2 ft and under	34.00 to 34.50
Steel axle turn.	32.00 to 32.50
Drop forge flashings	33.00 to 33.50
No. 1 RR. hvy. melting	33.50 to 34.00
Rails 3 ft and under	43.00 to 44.00
Rails 18 in. and under	44.00 to 45.00
No. 1 machinery cast	44.00 to 45.00
RR. cast	44.00 to 45.00
RR. grate bars	32.00 to 33.00
Stove plate	36.00 to 37.00
Malleable	38.00 to 39.00

Youngstown

No. 1 hvy. melting	$35.50 to $36.00
No. 2 hvy. melting	30.50 to 31.00
No. 1 bundles	35.50 to 36.00
No. 2 bundles	$29.50 to $30.00
Machine shop turn.	22.50 to 23.00
Shoveling turnings	26.00 to 26.50
Cast iron borings	26.00 to 26.50
Low phos. plate	36.50 to 37.00

Buffalo

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	27.50 to 28.00
No. 1 busheling	27.50 to 28.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	27.50 to 28.00
Machine shop turn.	19.00 to 19.50
Mixed bor. and turn.	20.00 to 20.50
Shoveling turnings	21.00 to 21.50
Cast iron borings	20.00 to 20.50
Low phos. plate	31.00 to 32.00
Scrap rails, random lgth.	33.50 to 34.00
Rails 2 ft and under	39.50 to 40.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 cupola cast	38.00 to 38.50
Mixed yard cast	36.00 to 36.50
Stove plate	35.00 to 35.50
Small indus. malleable	24.00 to 24.50

Birmingham

No. 1 hvy. melting	$27.00
No. 2 hvy. melting	26.00
No. 2 bundles	24.00
No. 1 busheling	26.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00
Bar crops and plate	31.00 to 32.00
Structural and plate	31.00 to 32.00
No. 1 RR. hvy. melt.	29.00 to 29.50
Scrap rails, random lgth.	32.00 to 33.00
Rerolling rails	39.00 to 40.00
Rails 2 ft and under	36.00 to 36.50
Angles & splice bars	35.00 to 36.00
Std. steel axles	28.00 to 29.00
No. 1 cupola cast	34.00 to 35.00
Stove plate	28.00 to 29.00
Cast iron carwheels	28.00 to 29.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 2 bundled sheets	26.00 to 27.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Rails, random lengths	35.00 to 36.00
Rails 3 ft and under	38.00 to 40.00
Locomotive tires, uncut	29.00 to 30.00
Angles and splice bars	37.00 to 38.00
Std. steel car axles	40.00 to 42.00
RR. spring steel	33.00 to 35.00
No. 1 machinery cast	37.00 to 38.00
Hvy. breakable cast.	31.00 to 32.00
Cast iron brake shoes	31.00 to 32.00
Stove plate	33.00 to 35.00
Cast iron car wheels	34.00 to 35.00
Malleable	30.00 to 32.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.00 to 21.00
No. 2 bundles	18.50 to 19.50
Machine shop turn.	12.50 to 13.50
Mixed bor. and turn.	12.50 to 13.50
Shoveling turnings	14.00 to 15.00
Clean cast chem. bor.	24.00 to 25.00
No. 1 machinery cast	31.00 to 32.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	27.00 to 28.00
Heavy breakable cast.	27.00 to 28.00
Unstrp. motor blocks	25.00 to 26.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$22.00 to $22.50
No. 2 hvy. melting	20.00 to 20.50
No. 1 bundles	22.00 to 22.50
No. 2 bundles	$17.00 to $17.50
Machine shop turn.	12.00 to 12.50
Mixed bor. and turn.	11.50 to 12.00
Shoveling turnings	13.50 to 14.00
No. 2 bushelings	14.00 to 14.50
Clean cast chem. borings	19.00 to 20.00
No. 1 machinery cast	32.00 to 34.00
No. 2 machinery cast	28.00 to 29.00
Heavy breakable cast	25.00 to 26.00
Stove plate	25.00 to 26.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	30.00 to 31.00
New bushelings	30.00 to 31.00
Flashings	28.00 to 29.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. plate	30.00 to 31.00
No. 1 cupola cast	39.00 to 40.00
Heavy breakable cast	31.00 to 32.00
Stove plate	30.00 to 31.00
Automotive cast	39.00 to 40.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	26.50 to 27.00
No. 1 bundles	29.50 to 30.00
No. 2 bundles	23.50 to 24.00
Machine shop turn.	17.50 to 18.00
Mixed bor. and turn.	17.50 to 18.00
Shoveling turnings	19.50 to 20.00
Cast iron borings	18.50 to 19.00
Low phos. 18 in. under	37.00 to 38.00
Rails, random lengths	36.00 to 37.00
Rails, 18 in. and under	44.00 to 45.00
No. 1 cupola cast	41.00 to 42.00
Hvy. breakable cast	34.00 to 35.00
Drop broken cast	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn	9.00
Elec. fur 1 ft and under	28.00
No. 1 RR. hvy. melting	20.00
Scrap rails, random lgth.	20.00
No. 1 cupola cast	$30.00 to 35.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Mach. shop turn.	12.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast	$36.00 to 40.00

Seattle

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	16.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	27.50
RR. hvy. melting	19.00
No. 1 cupola cast	$27.00 to 30.00
Heavy breakable cast	20.00

Hamilton, Ont.

No. 1 hvy. melting	$24.00
No. 1 bundles	16.00
No. 2 bundles	16.00
Mechanical bundles	22.00
Mixed steel scrap	20.00
Mixed bor. and turn.	18.00
Rails, remelting	24.00
Rails, rerolling	27.00
Bushelings	18.50
Bush., new fact, prep'd	22.00
Bush., new fact, unprep'd	17.00
Short steel turnings	15.00
Cast scrap	$40.00 to 43.00

Supplying mills, foundries, chemical plants and other industries with scrap iron and steel is our business. Experienced personnel and offices in important industrial and trading centers means integrated, competent service in the purchase or sale of scrap. Awareness of the latest developments in the field enables us to serve the needs of consumers with the best scrap according to grade, type, specifications, alloys or amount.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00 1													$50.00 31
Alloy, net ton	$51.00 1.17													$51.00 31
BILLETS, BLOOMS, SLABS Carbon, rerolling net ton	$52.00 1	$52.00 1	$52.00 1				$52.00 13		$52.00 3	$57.00 26	$52.00 3			
Carbon forging billets, net ton	$61.00 1	$61.00 1.4	$61.00 1.3	$61.00 4			$61.00 25		$61.00 3.4	$63.00 26	$61.00 3			$61.00 31
Alloy, net ton	$63.00 1.17	$63.00 1.4	$63.00 1		$63.00 4.42		$63.00 13	$63.00 3	$63.00 3.4	$65.00 26	$63.00 3			$63.00 31
SHEET BARS							$52.00 13							
PIPE SKELP	3.25 1.5						3.25 1.4							
WIRE RODS	3.40 2.18	3.40 2.4.33	3.40 6	3.40 2			3.40 6				3.40 3	3.50 3		
SHEETS Hot-rolled (18 ga. & hvr.)	3.25 1.5.9.15	3.25 23	3.25 1.6.8	3.25 4.5			3.25 1.4.6.13		3.25 3	3.35 26		3.25 3		3.45 13
Cold-rolled	4.00[1.5] 7.9.15.63		4.00 1.6.8	4.00 4.5		4.00 7	4.00 4.6		4.00 3			4.00 3	4.20 22	4.20 13
Galvanized (10 gage)	4.40 1.9.15		4.40 1.8		4.40 4		4.40 64					4.40 3		
Enameling (12 gage)	4.40 1		4.40 1.8	4.40 4		4.40 7	4.40 6						4.80 22	4.70 13
Long ternes (10 gage)	4.80 9.15		4.80 1			4.80 7								
Hi Str. low alloy, h.r.	4.95 1.5.9	4.95 1	4.95 1.6.8	4.95 4.5			4.95 1.4.6.13		4.95 3	4.95 26		4.95 3		5.15 13
Hi Str. low alloy c.r.	6.05 1.5		6.05 1.6.8	6.05 4.5			6.05 4.6.13		6.05 3			6.05 3		6.25 13
Hi Str. Low alloy, galv.	6.75 1			6.75 4	6.75 4							6.75 3		
STRIP Hot-rolled	3.25 5.7.9.23	3.25 23.66	3.25 1.6.8	3.25 5			3.25 1.4.6.13		3.25 3			3.25 3		3.45 12.47
Cold-rolled	4.00 5.7.9.63	4.15 66	4.00 8	4.00 2.5		4.00 7	4.00 4.6.13.40.45.49		4.00 3			4.00 3		4.20[13.47] 4.25[60.61]
Hi Str. low alloy, h.r.	4.95 5		4.95 1.6.8	4.95 5			4.95 1.4.6.13		4.95			4.95 3		5.15 13
Hi Str. low alloy c.r.	6.05 5.9			6.05 2.5			6.05 4.6.13		6.05 3			6.05 3		6.25 13
TINPLATE‡ Cokes, 1.50-lb. base box	$7.75 1.5.9.15		$7.75 1.6.8				$7.75 4					$7.85 3	$7.95 22	
Electrolytic 0.25, 0.50, 0.75 lb bo	Deduct $1.30, $1.05 and 75¢ respectivel from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30 1.5.15		5.30 1.6.8				5.30 4					5.40 3	5.50 22	
BARS Carbon steel	3.35 1.5.9.17	3.35 1.4.23	3.35 1.6.8	3.35 4	3.35 4		3.35 1.4.6		3.35 3.4		3.35 3			3.55 13
Reinforcing‡	3.35 1.5	3.35 4	3.35 1.6.8	3.35 4	3.35 4		3.35 1.4.6		3.35 3.4		3.35 3	3.35 3		
Cold-finished	3.95[3] 4.00[3.4] 17.52.69.71	4.00[3] 23.69.70	4.00 4.73.74	4.00 2.61	4.00 4.62		4.00 6.40.57		4.00 70					4.30 13
Alloy, hot-rolled	3.75 1.17	3.75 1.4.23	3.75 1.6.8		3.75 4.42		3.75 1.6.25	3.75 3	3.75 3.4		3.75 3			4.05 13
Alloy, cold-drawn	4.65 2.17.52.69.71	4.65 2.23.69.70	4.65 4.73.74	4.65 2.61	4.65 4.42.62		4.65 6.25.57	4.65 3	4.65 3.70					
Hi Str. low alloy, h.r.	5.10 1.5		5.10 1.6.8	5.10 4			5.10 1.8	5.10 3	5.10 3		5.10 3			5.30 13
PLATE Carbon Steel	3.40 1.5	3.40 1	3.40 1.6.8	3.40 4			3.40 13		3.40 3	3.50 26	3.40 3	3.40 3		3.65 3
Floor plates	4.55 1	4.55 1	4.55 8	4.55 5						4.55 26				
Alloy	4.40 1	4.40 1	4.40 1				4.40 13			4.40 26	4.40 3	4.40 3		
Hi St . low alloy	5.20 1.5	5.20 1	5.20 1.8	5.20 4.5			5.20 6			5.20 26	5.20 3	5.20 3		5.45 13
SHAPES, Structural	3.25 1.5.9	3.25 1.23	3.25 1.6.8					3.30 3	3.30 3		3.30 3			
Hi Str. low alloy	4.95 1.5	4.95 1	4.95 1.6.8				4.95 6	5.05 3	5.05 3		5.05 3			
MANUFACTURERS' WIRE Bright	4.15 2.5.18	4.15[3] 4.33.64		4.15 2.77			4.15 6				4.15 3	4.25	Duluth—4.15[3] Pueblo—4.50[14]	
PILING, Steel sheet	4.05 1.9	4.05 1							4.05 3					

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STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
					INGOTS Carbon forging, net ton
	$58.00 88				Alloy, net ton
		$82.00 11	F=$71.00[19]		BILLETS BLOOMS, SLABS Carbon, rerolling, net ton
	$69.00 88	$81.00 11	F=$80.00[19]	Geneva=$81.00[16]	Carbon forging billets, net ton
	$71.00 88		F=$82.00[19]		Alloy net ton
				Mans'eld=$58.00 G. T.[75] Portsmouth=155.00[20]	SHEET BARS
					PIPE SKELP
	3.95 88		SF, LA=4.05[24] LA=4.20[82]	Portsmouth=3.40[20] Worcester=3.70[3]	WIRE RODS
		3.25 4.11	LA=3.95[24] F=4.15[19]	Kokomo,[30] Ashland[7]=3.25	SHEETS Hot-rolled (18 ga. & hvr.)
		4.00 11	SF=4.95[24] F=4.90[19]		Cold-rolled
		4.40 4.11	SF, LA=5.15[24]	Ashland=4.40[7]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		4.95 11			Hi Str low alloy, h.r.
					Hi Str. low alloy, c.r.
					Hi Str. low alloy, galv.
3.85 88	3.65 88	3.25 11	SF, LA=4.00[82] F=4.40[19], S=4.25[82]	Ashland=3.25[7] Atlanta=3.40[55]	STRIP Hot-rolled
			F=4.90[19]	New Haven=4.50[2-49]	Cold-rolled
		4.95 11			Hi Str. low alloy, h.r.
			F=6.95[19]		Hi Str low alloy, c.r
		$7.85 11	SF=$8.50[24]		TINPLATE Cokes, 1.50-lb, base box
Deduct $1.33, $1.05 and 75¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
3.95 88	3.75 88	3.35 4.11	SF, LA=4.05[24] LA=4.05[82]	Atlanta=3.50[55]	BARS Carbon steel
3.95 88	3.75 88	3.35 4.11	SF, S=4.10[82] F=4.00[19]	Atlanta=3.50[55]	Reinforcing††
				Putnam, Newark=4.40[59] Cumberland=3.95[72]	Cold-finished
4.35 88			LA=4.80[82] F=4.75[19]		Alloy, hot-rolled
				Newark,[59] Worcester[3]=4.95	Alloy, cold-drawn
		5.10 4			Hi Str. low alloy, h.r.
	3.80 88	3.40 4.11	F=4.00[19] S=4.30[82] Geneva=3.40[16]	Claymont=3.50[20] Coatesville=3.50[21] Harrisburg=3.75[38]	PLATE Carbo steel
				Harrisburg=4.55[38]	Floor plates
				Coatesville=4.50[21]	Alloy
		5.20 11		Geneva=5.20[16]	Hi Str. low alloy
3.85 88	3.65 88	3.25 11	SF=3.80[82] LA=3.85[62] 3.95[24]		SHAPES, Structural
		4.95 11	F=3.80[19] S=3.90[82]		Hi Str. low alloy
4.75 88	4.55 88	4.15 4.11	SF, LA=5.10[24] LA=5.10[62]	Portsmouth=4.15[20] Worcester=4.45[3]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes, deduct $1.10 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $2.00 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R.R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Co., Inc., Oakland, Calif.
20 Portsmouth Steel Corp., Portsmouth, Ohio
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Midvale Co., Philadelphia
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 American Chain & Cable Co., Inc., New York
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52. Superior Drawn Steel Co., Monaca, Pa.
53 A. M. Byers Co., Pittsburgh
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Latrobe Electric Steel Co., Latrobe, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 Vanadium-Alloys Steel Co., Latrobe, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Indianapolis
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forgings Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Flat-Rolled Steel: (cents per pound)	Nov. 22, 1949	Nov. 15, 1949	Oct. 25, 1949	Nov. 23, 1948
Hot-rolled sheets	3.25	3.25	3.25	3.26
Cold-rolled sheets	4.00	4.00	4.00	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.265
Cold-rolled strip	4.038	4.038	4.038	4.063
Plates	3.40	3.40	3.40	3.42
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.35	3.37
Cold-finished bars	3.995	3.995	3.995	3.995
Alloy bars	3.75	3.75	3.75	3.75
Structural shapes	3.25	3.25	3.25	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	4.256
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$3.20
Light rails	3.55	3.55	3.55	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$52.00
Slabs, rerolling	52.00	52.00	52.00	52.00
Forging billets	61.00	61.00	61.00	61.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	63.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.40	3.619
Skelp	3.25	3.25	3.25	3.25

Pig Iron: (per gross ton)	Nov. 22, 1949	Nov. 15, 1949	Oct. 25, 1949	Nov. 23, 1948
No. 2, foundry, Phila.	$50.42	$50.42	$50.42	$51.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	46.08	46.08	46.08	49.47
No. 2, Birmingham	39.38	39.38	39.38	43.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	50.76
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese‡	173.40	173.40	173.40	161.71

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)	Nov. 22, 1949	Nov. 15, 1949	Oct. 25, 1949	Nov. 23, 1948
Heavy melt'g steel, P'gh.	$33.75	$32.75	$28.75	$42.75
Heavy melt'g steel, Phila.	25.50	25.50	22.50	44.50
Heavy melt'g steel, Ch'go	30.50	30.50	25.50	41.75
No. 1 hy. comp. sh't Det.	30.50	27.50	19.50	38.00
Low phos. Young'n	36.75	36.75	29.75	47.75
No. 1, cast, Pittsburgh	39.50	39.50	39.50	70.00
No. 1, cast, Philadelphia	38.00	38.00	35.50	66.50
No. 1, cast, Chicago	*44.50*	45.00	42.00	72.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$15.00
Foundry coke, prompt	15.75	15.75	15.75	17.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	18.50	18.50	17.625	23.50
Copper, Lake Conn.	18.625	18.625	17.75	23.625
Tin Straits, New York	*85.00*	94.00	95.00	$1.03
Zinc, East St. Louis	9.75	9.75	9.25	17.50
Lead, St. Louis	*11.80*	12.55	12.80	21.30
Aluminum, virgin	17.00	17.00	17.00	17.00
Nickel electrolytic	42.97	42.97	42.97	42.90
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	32.00	35.00

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Nov. 22, 1949	3.705¢ per lb.	$45.88 per gross ton	$29.92 per gross ton
One week ago	3.705¢ per lb.	45.88 per gross ton	29.58 per gross ton
One month ago	3.705¢ per lb.	45.88 per gross ton	25.58 per gross ton
One year ago	3.720¢ per lb.	46.91 per gross ton	43.00 per gross ton

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1949	3.720¢ Jan. 1	3.705¢ May 3	$46.82 Jan. 4	$45.88 Sept. 6	$43.00 Jan. 1	$19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 11
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 23
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75336¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

UNIVERSITY OF MICHIGAN LIBRARIES

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	122
Woven wire fence†	109	132
Fence posts, carloads††	112	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

*Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 Columns higher. †15½ gage and heavier. **On 80 rod spools, in carloads. ††Duluth, Joliet and Johnstown.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡Add 30¢ at Worcester; 10¢ at Sparrows Pt.

‡‡Less 20¢ to jobbers.

PRODUCING POINTS — *Standard, coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City (except bale ties), 83.

Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26.

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct, Coatesville, Pa. (21)	*26.50	
Washgtn, Pa. (39)	*26.50	
Claymont, Del. (29)	*26.50	
Conshohocken, Pa. (26)		*22.50
New Castle, Ind. (55)	*26.50	*24.00
Nickel-carbon 10 pct, Coatesville, (26)	27.50	
Inconel-carbon 10 pct, Coatesville, (21)	36.00	
Monel-carbon 10 pct, Coatesville, (21)	39.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (41)		75.00
Aluminized steel sheets, hot dip, Butler, Pa., (7)		7.75

*Includes annealing and pickling, or sandblasting.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Toronto, Ohio, 63; Vandergrift, Pa. 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. shorter	34
All diam., longer than 6 in.	30
Lag, all diam over 6 in. & longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowances of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.20
Joint bars, per 100 lb	4.25
Light rails per 100 lb	3.55

	Base Price cents per lb
Track spikes†	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburgh, Torr., Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.

†Kansas City, 5.60¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, Pa., 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, Pa. 3; Minnequa, Colo., 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, Ohio, 6; Youngstown, 4.

Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium	52¢
Oil hardened manganese	29¢
Special carbon	26.5¢
Extra carbon	22¢
Regular carbon	19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$15.50 to $16.00
Foundry, oven coke	
Buffalo, del'd	$20.90
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Plainesville, Ohio, f.o.b.	20.90
Erie, del'd	$20.25 to 21.04
Cleveland, del'd	22.62
Cincinnati, del'd	21.71
St. Paul, f.o.b.	22.50
St. Louis, del'd.	21.60
Birmingham, del'd	18.75

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more	$37.00
60% or less	34.00

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 15c to base price except Cincinnati and New Orleans (*), add 10c; New York, Chicago and Boston, add 20c).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (16 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As-rolled	Hot-Rolled A 4140-50 Ann.	Cold-Drawn A 1615 As-rolled	Cold-Drawn A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.96-7.11	5.37	....	5.56	5.36	5.42	6.16	....	9.60-10.10	....	....
Birmingham	4.85	5.75	6.15	4.85	....	5.10	4.90	4.90	6.89	....	..	..	....
Boston	5.55	6.45-6.75	7.11-7.61	5.60	6.75	5.75	5.42	5.52	6.02	9.36-9.67	9.67-9.87	10.72	11.02
Buffalo	4.85	5.75	7.42-7.57	5.24	7.27	5.38	5.00	4.95	5.40	9.38	9.80	10 85	10.95
Chicago	4.85	5.75	6.85	4.85	5.45-6.15	5.10	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Cincinnati*	5.16-5.51	5.84-6.28	6.58-6.93	5.20-5.43	....	5 53-5.85	5.33	5.33-5 48	6.08-6.20	9.74	9.99	11 19	11.44
Cleveland	4.85	5.75	6.70	5.03	....	5 21	5.01	5.01	5.45	9.05	9.35	10.40	10.70
Detroit	5.28-5.32	6.07-6.16	7.38-7.58	5.27-5.47	6.27-6.56	5 32-5 57	5.33-5 40	5.33-5.55	6.00-6.19	9.67	9.92	11.11	11.35
Houston	6 79-6.95	....	7.30	6.70	.	6.70	6 70-6.70	6.40-6.65	7.60	10.45	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.38	5.54	5.34	5.34	6.14	11.25	11.39		....
Kansas City	5.50	6.40	7.50	5.50	6.95[5]	5.75	5.55	5.55	6.10	9.55	9.85	10.90	11.20
Los Angeles	5.45	7.00	7.45	5.95	7.35[10]	5.50	5.45	5.60	7.25	....	....	....	....
Memphis	5.75-5.90	6.60	7.20	5.80-5.95	6.90	5 95-6 10	5.75	5.75	6.53	....	.		....
Milwaukee	5 03	5.93	7.02	5.03-5.38	6.32	5.70	5.08	5.08	5.63	9.08	9.38	10.43	10.73
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[6]				....
New York	5.40	6.31	6.85-6.90	5.62	6.76	5.65	5.33	5.57	6.31	9.28	9.58	10.63	10.93
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.05	....			....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	.		....
Philadelphia	4.95	6.24[13]	6.63	5.40	6.29	5.35	5.10	5.40	5.95	9.05	9.35	10.62	10.97
Pittsburgh	4.85	5.75	6.90	5.00	6.00	5.05	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Portland	6.53[8]-7.05	8.00	8.80-9.10	6.85[8]	....	6.30[8]	6.35[8]	6.35[8]	8.25[14]	10.50[8]	10.10[8]	..	....
Salt Lake City	7.05	7.05	8 65-8 65	7.45[3]	....	5.65[3]	6.50[3]	7.10[8]	8.15	...			....
San Francisco	6.15[8]	7.50[2]	7.80	6.75[8]	8.25[8]	6.35[8]	5.90[8]	5.90[8]	7.75	9.80	10.00	11.20	11.60
Seattle	6.70[4]-7 10	8.15[2]-8.65	8.80-9.30	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	..	10.35[15]		13.10[15]
St. Louis	5.22-5.37	6.12-6.27	7.32	5.22	6.68-7.54	5.47	5.27	5.27	5.82	9.27-9.72	9.57-9.97	10 62-11 17	10.92-11.42
St. Paul	5.44	6.19-6 34	7.54-7 64	5.44	6.82	5.64-6 60	5.49	5.49	6.04	9.49	9.79	10 84	11.14

BASE QUANTITIES *Standard unless otherwise keyed on prices.*

Hot-Rolled:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

Cold-Rolled:
Sheets, 400 to 1499 lb strip, extras on all quantities. Bars 1000 lb and over.

Alloy Bars:
1000 to 1999 lb.

Galvanized Sheets:
450 to 1499 lb.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb; (20) 6000 lb and over.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	38.88	39.38	.. ..	...	.....
Buffalo	46.00	46.50	47.00	...	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	50.50	51.00	.....	.....
Granite City	47.50	48.48	48.90	.....	.....
Ironton, Utah	46.00	46.50	...	...	.....
Pittsburgh	46.00	46.50	46.50	47.00	.....
Geneva, Utah	46.00	46.50	...	...	.....
Sharpsville	46.00	46.50	46.50	47 00	...
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	...	...	...	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	...
Troy, N. Y.	48.00	48.50	49.00	...	54.00
Youngstown	46.00	46.50	46.50	47.00	...

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.50	51.00		
Boston	Steelton	6.90	.....				60.90
Brooklyn	Bethlehem	4.29	...	52.79	53.29	53 79	.....
Cincinnati	Birmingham	6.70	45.58	46 08			.....
Jersey City	Bethlehem	2 63		51 13	51.63	52 13	.....
Los Angeles	Geneva-Ironton	7.70	53.70	54 20			
Mansfield	Cleveland-Toledo	3.33	49.33	49 83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	50.39	50 89	51.39	51.89	.....
Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50 94	.....
Philadelphia	Steelton	3.09					57.09
Rochester	Buffalo	2.63	48.63	49.13	49.63		.....
San Francisco	Geneva-Ironton	7 70	53.70	54.20			.....
Seattle	Geneva-Ironton	7.70	53 70	54.20			.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	49.58	50.08	50.58		.....

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

UNIVERSITY OF MICHIGAN LIBRARIES

FERROALLOYS

Ferromanganese

78-82% Mn, Max'mum contract base price, gross ton, lump size.
F.o.b. Birmingham $174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont. $172
F.o.b. Johnstown, Pa. $174
F.o.b. Sheridan, Pa. $172
F.o.b. Etna, Clairton, Pa. $175
$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.45
Ton lots 12.05
Less ton lots 12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, packed 35.5
Ton lots 37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 28
Ton lots 30
Less ton lots 32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 8.95
Ton lots 10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet 10.30
Ton lots 11.90
Less ton lots 12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed
96% Si, 2% Fe 20.70
97% Si, 1% Fe 21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.
Carload, bulk 6.30
Ton lots 7.90
Less ton lots 8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.
25% Si 17.00
50% Si 11.30
75% Si 13.50
85% Si 14.65
90-95% Si 16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)
0.06% C 28.75
0.10% C 28.25
0.15% C 28.00
0.20% C 27.75
0.50% C 27.50
1.00% C 27.25
2.00% C 27.00
65-69% Cr, 4-9% C 20.50
62-66% Cr, 4-6% C, 6-9% Si 21.35
Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.
Carload bulk 13.75
Ton lots 15.25
Less ton lots 16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.
Carloads 21.60
Ton lots 23.75
Less ton lots 25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.
Carloads 27.75
Ton lots 30.05
Less ton lots 31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.
0.20% max. C $1.09
0.50% max. C 1.05
9.00% min. C 1.04

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.
30-33% Ca, 60-65% Si, 3.00% max. Fe.
Carloads 17.90
Ton lots 21.00
Less ton lots 22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads 19.25
Ton lots 21.55
Less ton lots 22.55

CMSZ

Contract price, cents per pound of alloy, delivered
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.
Ton lots 19.75
Less ton lots 21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.
Ton lots ..... 15.75¢
Less ton lots ..... 17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed ..... 17.00¢
Ton lots to carload packed ..... 18.00¢
Less ton lots ..... 19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.
Ton lots 17.25
Less ton lots 18.50

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 7.40¢
Ton lots ..... 8.80¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo. ..... 96¢
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.
Ton lots $3.90
Less ton lots 3.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.10
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti. $1.25
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti. $1.40
Less ton lots 1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton $160.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.
Openhearth $2.90
Crucible 3.00
High speed steel (Primos) 3.10
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per lb contained Mo. 95¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk, lump ..... 11.00¢
Ton lots, bulk, lump ..... 11.50¢
Ton lots, packed, lump ..... 11.75¢
Less ton lots, lump ..... 12.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 6.60¢

Boron Agents

Contract prices, per lb of alloy, del.
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B $4.25
Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ..... 50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.
Ton lots, per pound ..... 8.625¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.20
F.o.b. Wash., Pa.; 100 lb and over
10 to 14% B. ..... .75
14 to 19% B. 1.20
19% min. B. 1.50
Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over.
No. 1 ..... 93¢
No. 6 ..... 63¢
No. 79 ..... 45¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.
Ton lots $1.67
Less ton lots 1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.80
Silcaz, contract basis, delivered
Ton lots ..... 45.00¢

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	38.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	49.50	27.00	33.50	27.50

Numbers correspond to producers. See Key on Steel Price Page.

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 49; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago 1, 67; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Chicago, 67; Trenton, N. J., 45; Harrison N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

REFRACTORIES (*F.o.b. works*)

Fire Clay Brick — *Carloads, Per 1000*

First quality, Pa., Ky., Mo., Ill. (except Salina, Pa., add $5) $80.00
No. 1 Ohio 74.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 74.00
No. 2 Ohio 66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $80.00
Childs, Pa. 84.00
Hays, Pa. 85.00
Chicago District 89.00
Western, Utah and Calif. 95.00
Super Duty, Hays, Pa., Athens, Tex. .... $85.00 to 95.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) .. $13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa. 16.00
Silica cement, net ton, bulk, Ensley, Ala. 15.00
Silica cement, net ton, bulk, Chicago District .... $14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif. 21.00

Chrome Brick — *Per Net Ton*

Standard chemically bonded, Balt., Chester $69.00

Magnesite Brick

Standard, Balt. and Chester $91.00
Chemically bonded, Balt. and Chester 80.00

Grain Magnesite — *Std. ¾-in. grains*

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed .... $56.00 to 56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines .... $30.50 to 31.00
in sacks with fines .... 35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢ $12.25

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags .... 7.4¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots .... 9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe .... 31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe .... 48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe .. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8+% Fe 90.0¢ to $1.75
Aluminum .... 29.00¢
Antimony .... 45.78¢
Brass, 10 ton lots .... 22.75¢ to 25.75¢
Copper, electrolytic .... 28.625¢
Copper, reduced .... 28.50¢
Cadmium $2.40
Chromium, electrolytic, 99% min. $3.50
Lead .... 19.92¢
Manganese .... 55.00¢
Molybdenum, 99% $2.65
Nickel, unannealed .... 61.00¢
Nickel, spherical, minus 30 mesh, unannealed .... 68.00¢
Silicon .... 34.00¢
Solder powder .... 8.5¢ plus metal cost
Stainless steel, 302 .... 75.00¢
Tin $1.06
Tungsten, 99% $2.90
Zinc, 10 ton lots .... 15.50¢ to 18.25¢

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
	CARBON	
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price, about $200.00 per net ton

Standard, Threaded and Coupled

	Black	Galv
Steel, buttweld*		
½-in.	43 to 41	26½ to 24½
¾-in.	46 to 44	30½ to 28½
1-in.	48½ to 46½	33½ to 31½
1¼-in.	49 to 47	34 to 32
1½-in.	49½ to 47½	34½ to 32½
2-in.	50 to 48	35 to 33
2½ to 3-in.	50½ to 48½	35½ to 33½
Steel, lapweld		
2-in.	39½	26 to 24
2½ to 3-in.	43½ to 42½	28 to 27
3½ to 6-in.	46½ to 42½	31 to 27
Steel, seamless		
2-in.	38½	23
2½ to 3-in.	41½	26
3½ to 6-in.	43½	28
Wrought Iron, buttweld		
½-in.	+20½	+47
¾-in.	+10½	+36
1 & 1¼ in.	+ 4½	+27
2-in.	— 1½	+23½
3-in.	— 2	+23
Wrought Iron, lapweld		
2-in.	+ 7½	+31
2½ to 3½-in.	+ 5	+26½
4-in.	list	+20½
4½ to 8-in.	+ 2	+22

Extra Strong, Plain Ends

Steel, buttweld		
½-in.	42 to 40	27 to 25
¾-in.	46 to 44	31 to 30
1-in.	48 to 46	34 to 32
1¼-in.	48½ to 46½	34½ to 32½
1½-in.	49 to 47	35 to 33
2-in.	49½ to 47½	35½ to 34½
2½ to 3-in.	50 to 48	36 to 34
Steel, lapweld		
2-in.	39½ to 38½	25 to 24
2½ to 3-in.	44½ to 42½	30 to 28
3½ to 6-in.	48 to 44	33½ to 31½
Steel, seamless		
2-in.	37½	23
2½ to 3-in.	41½	27
3½ to 6-in.	45	30½
Wrought Iron, buttweld		
½-in.	+16	+40
¾-in.	+ 9½	+34
1 to 2-in.	— 1½	+23
Wrought Iron, lapweld		
2-in.	+ 4½	+27½
2½ to 4-in.	— 5	+16
4½ to 6-in.	— 1	+20½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct.
*Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive

OD in in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.79

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $95.70
6 to 24-in., del'd N. Y. .... $92.50 to 97.40
6 to 24-in., Birmingham 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 10%
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

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Iron Age Introduces

Continued from Page 23

John A. Steer has been named New York district manager of YARNALL-WARING CO., Philadelphia, succeeding **Harold S. Webster** who has retired. Mr. Steer was formerly district manager of the Philadelphia territory for the company. **J. B. Ambler** has been appointed sales representative in the Denver district.

WILLIAM H. KILKENNY, general manager, Hyster Co.

William H. Kilkenny has been named general manager of the HYSTER CO., southern California retail store. Mr. Kilkenny has been engaged as a materials handling field consultant and in sales administrative work for the Hyster Co.

F. R. Wilkes and **K. R. Bartholomew** have been appointed sales engineers for SIMONDS ABRASIVE CO., Philadelphia. Mr. Wilkes will cover the Chicago area, and Mr. Bartholomew the Eastern Pennsylvania and Northern New Jersey territory.

John F. Walton, Jr., has been named general sales manager of special accounts and federal government sales of all products for GULF OIL CORP., Pittsburgh, and **John P. Knight**, assistant general sales manager. **L. F. Craig** has been appointed general sales manager of special products, and **R. C. Arnold**, general sales manager of extra-divisional market development. **R. B. James, John Pennywitt, J. A. Guyton** and **H. P. Roby**

Instantaneous Coolant Flow

with

RUTHMAN GUSHER COOLANT PUMPS

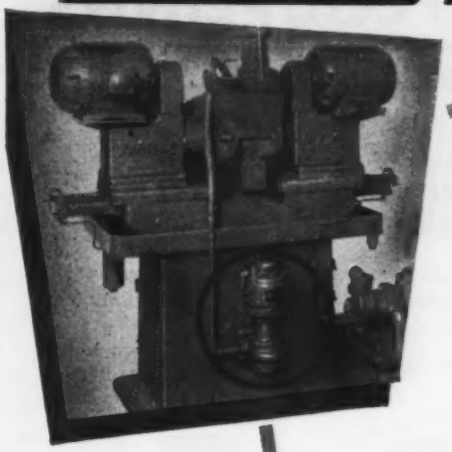


Photo Courtesy The Gardner Machine Co.

Illustrated is a typical installation of a Ruthman pump on a Gardner #77A-12" Double Spindle Grinder. The specific pump illustrated is a Ruthman Model 11022.

There is no waiting with Ruthman Gusher Coolant Pumps. From the moment the machine starts you get copious coolant flow that can be controlled in a split second from a trickle to full volume. Ruthman Pumps do not build up pressure when throttled, there is no priming or packing needed.

Join the thousands of metal-cutting machine operators all over the country who know by experience that Ruthman Pumps give them better, more efficient service and long trouble-free life.

Write for literature today.

THE RUTHMAN MACHINERY CO.

1821 READING RD. CINCINNATI, OHIO

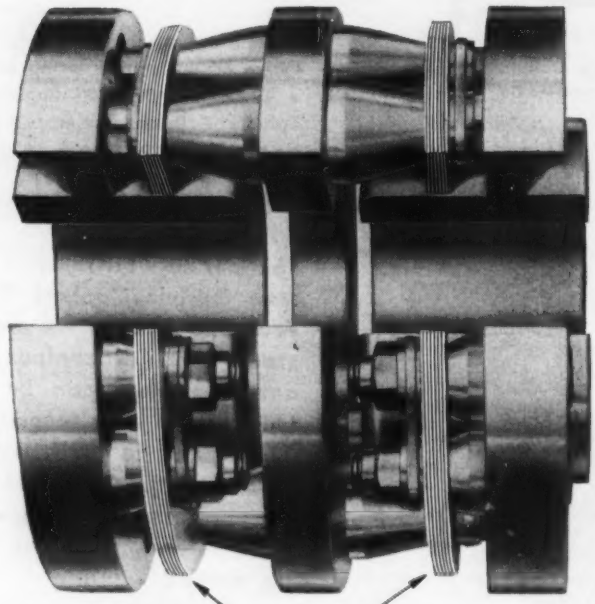
THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated LUBRICATION IS NOT REQUIRED!

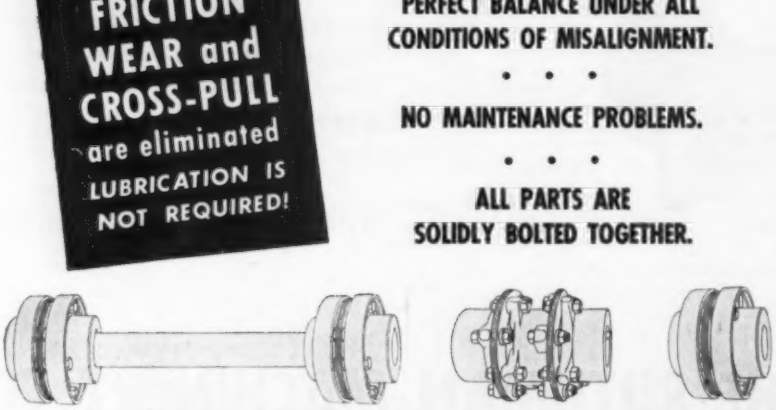
THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

• • •

NO MAINTENANCE PROBLEMS.

• • •

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

IRON AGE INTRODUCES

Continued

have been elected regional managers in the general sales department of the company. Mr. James will cover the Boston area, Mr. Pennywitt, New York, Mr. Guyton, Jacksonville, Fla., and Mr. Roby, Chicago.

J. L. CROSS, power transformer sales manager, Westinghouse Electric Corp.

Charles F. Wagner has been appointed consulting engineer for the WESTINGHOUSE ELECTRIC CORP., Pittsburgh, in the central station and power fields. Mr. Wagner has been manager of the central station section of the Westinghouse Industry Engineering department. **Thomas A. Daly** has been named engineering manager in charge of all naval ordnance work. **J. L. Cross** has been named manager of power transformer sales for the Westinghouse Transformer Div. succeeding **C. H. Bartlett** who has recently been made sales manager for the entire Transformer Div. **John E. Payne** has been appointed manager of the company's central district.

William T. Davidson has been appointed to the newly- reated position of general traffic manager by the NATIONAL GYPSUM CO., Buffalo. Mr. Davidson has been with National since 1937, serving first as supervisor of trucks and warehouses and has held various positions prior to his new appointment.

C. H. Wagner, Jr., has been named treasurer and **E. L. Dumas** comptroller of the PARKER APPLIANCE CO., Cleveland. The men succeed **O. P.**

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IRON AGE INTRODUCES

Continued

Bereit who has resigned as treasurer-comptroller to accept a position with another company. Mr. Wagner has held the office as secretary of the company since 1943 and was elected vice-president in 1945. Mr. Dumas

G. K. EGGLESTON, vice-president in charge of manufacturing, Non-Ferrous Perma Mold, Inc.

was previously associated with Kennametal, Inc., Latrobe, Pa., as comptroller.

G. K. Eggleston has been named vice-president in charge of manufacturing of NON-FERROUS PERMA MOLD, INC., Mansfield, Ohio, a new corporation jointly owned by the Barnes Mfg. Co. of Mansfield and the Non-Ferrous Die Casting Co., Ltd., of London, England. **S. E. Gregory** has been appointed general sales manager of the company. Previous to his present appointment, Mr. Eggleston was vice-president of engineering for the Barnes Mfg. Co.

William Rausch has been appointed assistant sales manager of RAPIDS-HANDLING EQUIPMENT CO., Buffalo. Mr. Rausch held a supervisory position at Chevrolet Motor and Axle Div. and was with Aluminum Corp. of America, in service engineering, prior to joining the sales force of the company.

R. D. Waterman has been elected vice-president of E. B. BADGER & SONS CO., Boston. **A. J. Broggini** has been named vice-president and sales manager in charge of foreign and domestic sales; **A. J. Connell**, vice-president and engineering manager in charge of all engineering, drafting, estimating and procurement,

ROTARY
R-C Blower and Gas Booster mounted on same bedplate, with V-belt drives from 5 HP motor. Capacity, 125 CFM.
ONLY R-C dual-ability GIVES YOU dual choice
CENTRIFUGAL
R-C Centrifugal Blower —24" type OIB, driven by 250 HP motor. Capacity, 15,220 CFM.

When it comes to choosing between Centrifugal and Rotary Positive Blowers and Exhausters, you'll get impartial suggestions from R-C *dual-ability*. That's because we build both —and we are the only blower manufacturer who gives you the benefit of this *dual choice*.

Another advantage of consulting us results from our wide range of units of both types. If it's 10 CFM you need, we'll supply it. Or, if your use calls for extremely large volume, we build them to any desired size.

One more point—air or gas handling equipment is our "bread and butter" . . . we have no other business. That means detailed and *interested* attention to your requirements from an organization that has specialized on that job for almost a century.

ROOTS-CONNERSVILLE BLOWER CORPORATION
911 Ohio Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE BLOWER BUILDERS R-C SINCE 1854

BLOWERS • EXHAUSTERS • BOOSTERS • LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

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FOR BETTER FURNACE EFFICIENCY
and DECREASED FUEL COSTS

Seal and Insulate Furnace Brickwork
with THERM-O-FLAKE

When BTU consumption or volume of excess air is not satisfactory, check the improvements possible with THERM-O-FLAKE. This is the insulation designed especially for open hearth furnaces, and used regularly by most operators on exposed brickwork surfaces such as bulkheads, checker arches, end and side walls.

Open hearth furnaces sealed and insulated with THERM-O-FLAKE show increased operating efficiency due to higher air preheat and higher flame temperature. There is an important increase in thermal efficiency in regeneration. Radiation losses are safely minimized with a reduction in fuel costs.

Write for detailed information on how THERM-O-FLAKE can improve your furnace efficiency and reduce fuel costs.

Illinois Clay Products Company
JOLIET, ILLINOIS

Exclusive Manufacturers of
Therm-O-flake Insulation

IRON AGE INTRODUCES

Continued

and **A. J. Good**, vice-president in charge of office management, contracts and engineering and construction cost analysis.

RAY A. RUGGE, chief engineer of Lear, Inc.

Ray A. Rugge has been appointed chief engineer of LEAR, INC., Grand Rapids. Prior to joining Lear, Mr. Rugge was head of the electrical design and development departments of the Airplane Div. of the Curtiss-Wright Corp., Columbus, Ohio.

H. C. Petersen has been named manager of the newly formed oil and gas division of FREEPORT SULPHUR CO., New York. Mr. Petersen has been superintendent of land and exploration for the company for the past six years. **Wayne Bowman**, consulting petroleum geologist, will be in charge of the Houston office.

Joseph V. Murray, Jr., has been named district representative of the PREST-O-LITE BATTERY CO., Toledo, succeeding **H. G. Holdsworth** who has resigned. **F. G. Hipp** has been appointed representative in the Indianapolis district, and **R. E. Hill** has taken over the Texas district of the company.

Charles T. Snow has been appointed to represent the GEO. P. REINTJES CO., Kansas City, in their sales of arches and walls. Mr. Snow will represent the company in the states of Louisiana, lower Mississippi, the southern part of Alabama and the State of Florida.

IRON AGE INTRODUCES

Continued

Bart **Smith and Edward W. Fisher** have been named sales representatives of ZIEGLER STEEL SERVICE CO., Los Angeles. Mr. Smith has been associated with A. M. Castle & Co., Chicago, United States Steel Supply Co., Chicago and Gilmore Steel & Supply Co. Mr. Fisher has been with Victor Equipment Co., San Francisco and will be available for consultation on welding problems.

H. W. FINNELL, JR., Pacific Coast sales manager, Phelps Dodge Copper Products Corp.

W. W. Finnell, Jr., has been named Pacific Coast sales manager for the PHELPS DODGE COPPER PRODUCTS CORP., New York. Mr. Finnell will make his headquarters in Los Angeles.

OBITUARIES

Daniel B. DeLand, 64, assistant to the vice-president in charge of manufacture, American Can Co., New York, died Nov. 14.

J. H. Hobbins, 66, president of the Anaconda Copper Mining Co., New York, died Nov. 14.

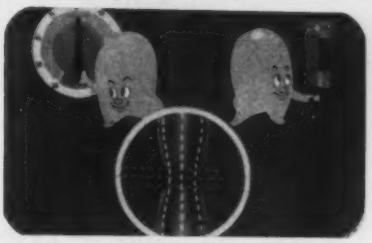
Philip S. Cottier, 59, purchasing agent of Pittsburgh Steamship Co., a subsidiary of U. S. Steel Corp., Chicago, died Nov. 11.

Morris Blumenthal, 58, partner in the Centre Machinery Co., New York, died Oct. 16.

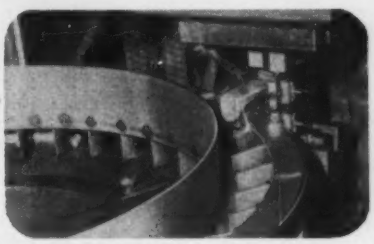
Resume your reading on Page 24

Can Resistance Welding Cut YOUR ASSEMBLY COSTS?

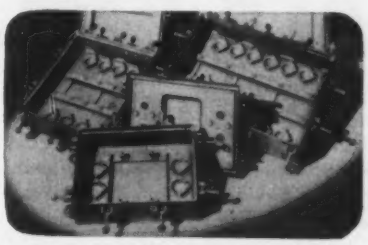
See this film and find out!



1. "THIS IS RESISTANCE WELDING", a full-color sound motion picture prepared by General Electric, will appeal to management, engineers, and shop men. Filmed with the layman in mind, this picture makes liberal use of cartoons (above) to simplify . . .

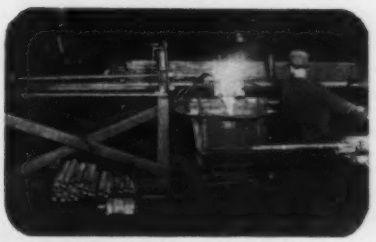


2 . . . the more technical aspects of resistance welding. Principal objective of the film, though, is to explain how resistance welding cuts fabricating and assembly costs. One application shown is the assembly of a blower rotor (above) where clearances . . .



3 . . . had always been a problem. Resistance welding cut manufacturing time by 75%! Another big saving dramatized in the film is the case of the switch boxes (above). These were formerly sand cast with holes individually located, drilled and tapped.

4. These are now completely welded on a continuous basis and production is up from a few hundred to 1000 units a day! The audience is also shown how another manufacturer welded studs on a steel cubicle framework (above) in one operation . . .



5 . . . instead of the seven formerly required! And for the cost-conscious executive, there's the story about the railroad that used resistance welding to save expensive seamless tubing (above). To give you a "preview" of this worthwhile film let us send you this . . .

6. RESISTANCE WELDING MANUAL . . . FREE! It's jam-packed with the kind of information on resistance welding you want. [Complete program consists of full-color 16mm film, manual, "highlights" booklets.] MAIL THE COUPON TODAY!

FREE *to business management!*

General Electric Co., Section B684-14
Schenectady 5, N. Y.

Attach to your business letterhead

☐ Please send me a complimentary copy of the G-E Resistance Welding Manual (GES-3393). (Extra copies at regular manual price—$1.00.)

☐ I'd like to borrow a 16mm print of the film from your nearest film library.

Name _____ Title _____

Company _____

Street _____

City _____ State _____

GENERAL ELECTRIC

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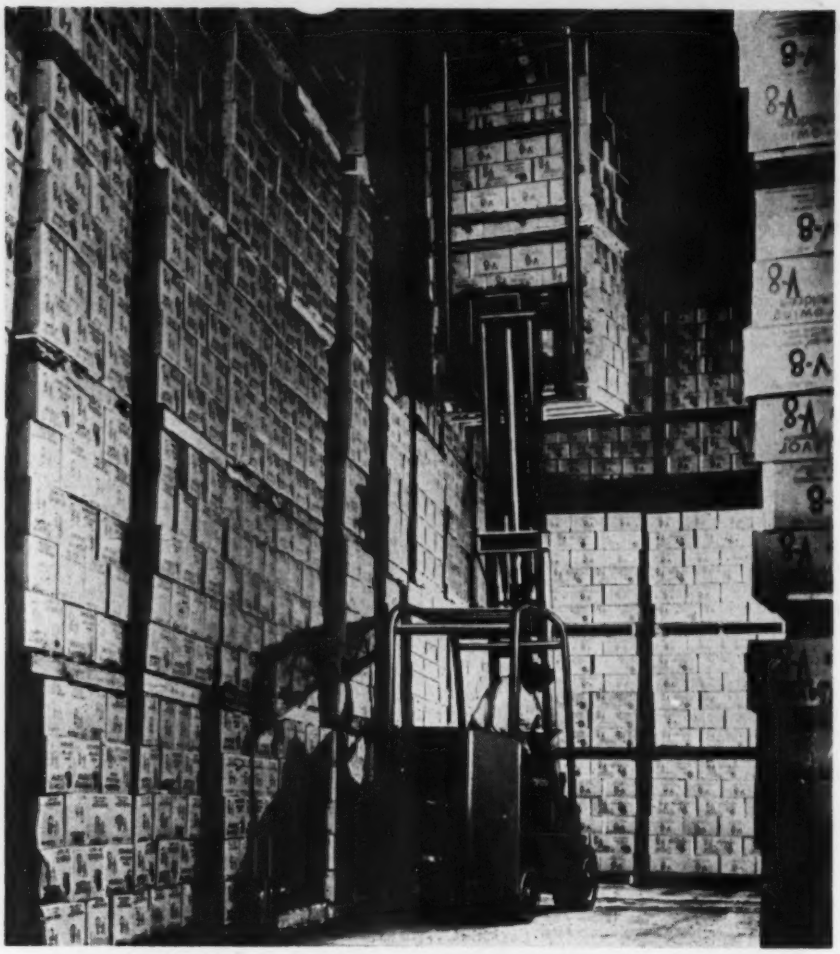
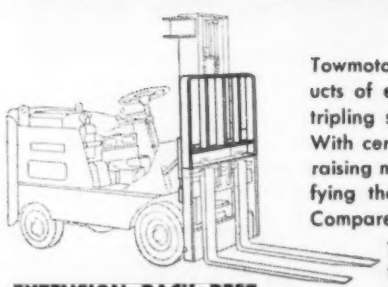


HIGH STACKER saves warehouse space



EXTENSION BACK REST
—another Towmotor Efficiency Feature
An extension accessory for the vertical carriage frame. Facilitates handling of unusually high multi-unit loads with stability and safety.

Towmotor Fork Lift Trucks stack materials and products of every size, shape and weight, doubling and tripling storage areas, freeing valuable floor space. With certain models, loads can be lifted 65" without raising mast . . . ideal for low ceiling areas . . . simplifying the task of moving supplies "in" and "out." Compare Towmotor with any other fork lift truck and you will see why Towmotor-Engineered features make every Mass Handling job easier, faster, safer. 10 models plus standard and specially designed accessories handle loads from 1500 to 15,000 lbs.—a Towmotor for every job. Write for a copy of "Handling Materials Illustrated." Towmotor Corporation, Division 15, 1226 E. 152nd St., Cleveland 10, Ohio. Representatives in all Principal Cities in U.S. and Canada.

every handling job is easier with TOWMOTOR MH!

TOWMOTOR
THE ONE-MAN-GANG®

FORK LIFT TRUCKS and TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

FREE

PUBLICATIONS

Continued from Page 34

in the new 21 p. catalog. A table showing the resistance of Saran to various chemicals at various temperatures is included, along with general properties and flow characteristics of the material. *Saran Lined Pipe Co. For more information, check No.* 13 *on the postcard on p.* 35.

Pressure Vessel Parts

Complete engineering data and specification details on pressure vessel accessories are included in a new 64 p. Catalog, 9-49. Welding necks, manways, nozzles, covers, rings, and other parts are described. *Lenape Hydraulic Pressing and Forging Co. For more information, check No.* 14 *on the postcard on p.* 35.

Heliwelding

A 16 p. booklet on Heliwelding, an inert gas shielded arc welding process, contains more than 25 illustrations, tables and photos, and explains the process and when to use it. *Air Reduction Sales Co. For more information, check No.* 15 *on the postcard on p.* 35.

Electrode Catalog

A new 32-p. welding electrode catalog in color describes line of mild steel, lo-alloy hi-tensile, stainless steel, hard surfacing, tool and die, cast iron, bronze, aluminum, as well as copper alloy and gas welding rods. *Champion Rivet Co. For more information, check No.* 16 *on the postcard on p.* 35.

Soldering Products

New Wall catalog describes line of soldering products including gasoline and kerosene blow torches, self-generating alcohol blow torches, electric soldering irons, solder, splicer's furnaces, paraffin supplies, and compound kettles. *P. Wall Mfg. Co. For more information, check No.* 17 *on the postcard on p.* 35.

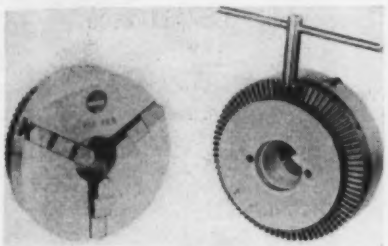
Resume Your Reading on Page 35

NEW

PRODUCTION IDEAS

Continued from Page 38

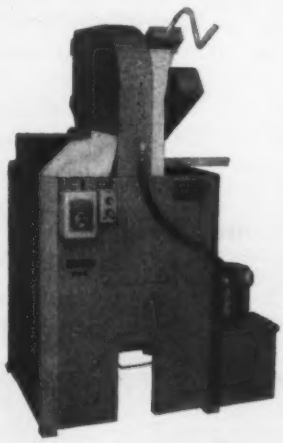
solid reversible jaws. It is threaded for direct attachment to 1½ in.-8 thread lathe spindles and can also be used on a milling machine divid-



ing head. A steel mounting plate is an accessory. *Westcott Chuck Co. For more information, check No.* 31 *on the postcard on p.* 35.

Cutting Machine

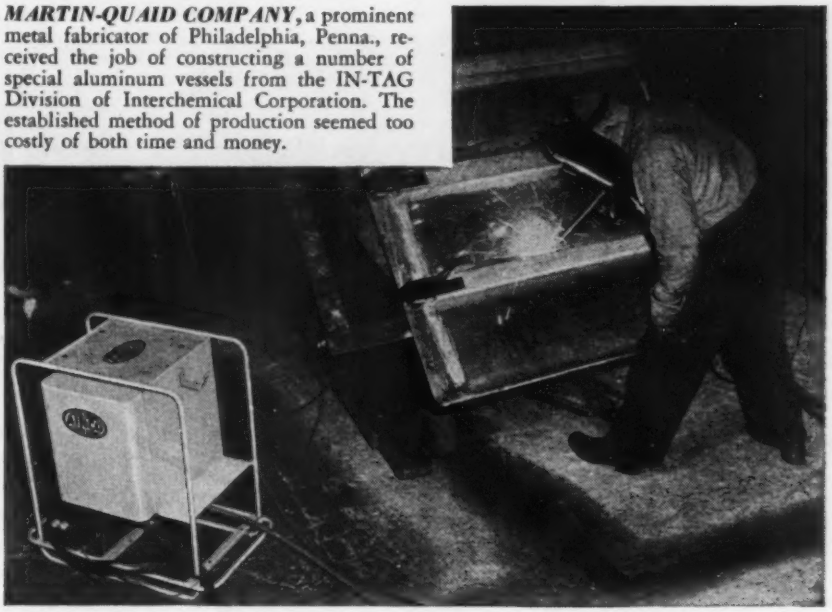
The Model 15 bar type abrasive cutting machine is available with 3 or 5 hp motor, each type arranged for wet or dry cutting. The machine is suitable for general purpose work, handles ferrous or nonferrous material, including corro-



sion resisting steels, hardened or annealed steels. It will cut light wall tubing up to 1½ in. diam and solid bar stock up to ¾ in. diam with the 3 hp motor, or light wall tubing up to 2 in. diam and solid bar stock up to 1 in. diam with a 5 hp motor. Cutting tubes, angles, bar stock, etc., within the machine's

new aircomatic process does three hours' work in fifteen minutes

MARTIN-QUAID COMPANY, a prominent metal fabricator of Philadelphia, Penna., received the job of constructing a number of special aluminum vessels from the IN-TAG Division of Interchemical Corporation. The established method of production seemed too costly of both time and money.



Dana V. Wilcox, Airco Technical Sales Representative, recommended the *new* Aircomatic Process with Airco Helium. Aluminum alloy ½″ and ¾″ thicknesses was used. The suggestion was adopted, and the process was applied to the job on a production basis.

Prior to the introduction of the new Aircomatic Process, Martin-Quaid used another arc welding method, but found welding time to be a disproportionate amount of its manufacturing costs. For example, the total welding time for a 4′ x 5′ x ½″ side section of the vessel took three hours. With the Aircomatic Process, the three-hour period was reduced to fifteen minutes—a tremendous saving in time and consequently cost.

Due to the speed of the Aircomatic Process as a production tool, Martin-Quaid is planning to expand its aluminum fabrication facilities.

• • • •

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To assure its customers of high efficiency in all applications of the oxy-acetylene flame or electric arc, Air Reduction has available the broad, practical experience of its nationwide Technical Sales Division personnel. The collective experience and knowledge of these specialists has helped thousands to a more effective use of Airco processes and products. Profit by this Airco "Plus-Value" service. Ask to have a Technical Sales Division man call today. Write: Your nearest Airco office. In Texas: Magnolia Airco Gas Products Company. On West Coast: Air Reduction Pacific Company.

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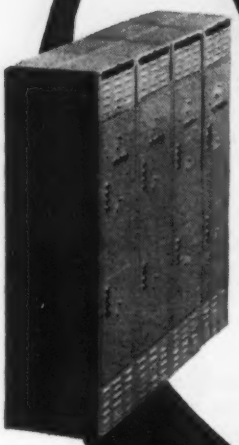
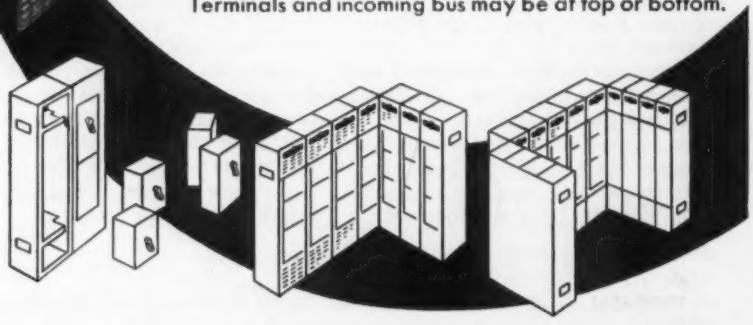


Use standardized, low-cost G-E motor control centers for 1 to 100-hp a-c motors. Save on installation, operation, and servicing. *Save on space*—vertical sections 12 inches deep, front connected. *Save on wiring*—"clothespin contact" means connection to incoming power in one quick shove—roomy five-inch-wide wiring troughs easily reached. Terminals and incoming bus may be at top or bottom.



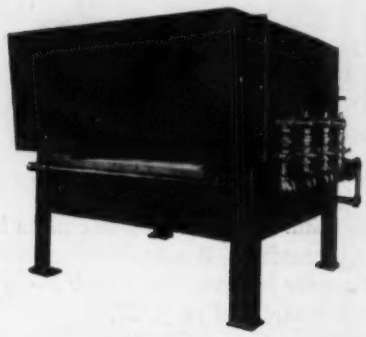
Protection to equipment and personnel assured. Each unit (NEMA Size 1, 2, 3, and 4 for 440 volts or below) is completely metal enclosed, has short-circuit and overload protection built in. Standard parts mean few spare parts to store, speed servicing. Locate all your control in one place, wherever space and operating conditions demand it. You'll like the *easy* way to modernize with G-E motor control centers. Write for Bulletin GEA-4979 for more details on this low-cost equipment. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL GE ELECTRIC

capacity can be accomplished with a minimum of burr by use of a suitable abrasive wheel. *Campbell Machine Div., American Chain & Cable Co., Inc. For more information, check No. 32 on the postcard on p. 35.*

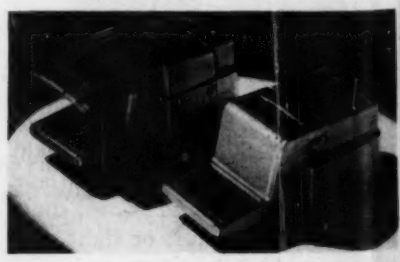
Forge Furnace

Gas-fired forge furnaces have been engineered for heavy duty, continuous operation, at 2200°F forging temperatures. The furnace shell is constructed of heavy angle framework with the sides and back of steel plate, electrically welded to structural steel legs. Burners are the semi-nozzle mixing McKee entrainment type, located to prevent flame impingement on the pieces being heated and to give uniform heat distribution. A McKee zero governor gives automatic control of the air-gas ratio. Burners use low pressure gas. *Eclipse Fuel Engineering Co. For more information, check No. 33 on the postcard on p. 35.*



Air Control Valve

Piston operated and pilot controlled, new foot operated air cylinder control valve is a reciprocating, packless, disk-type valve known as Model NFS. It directs compressed air alternately to two



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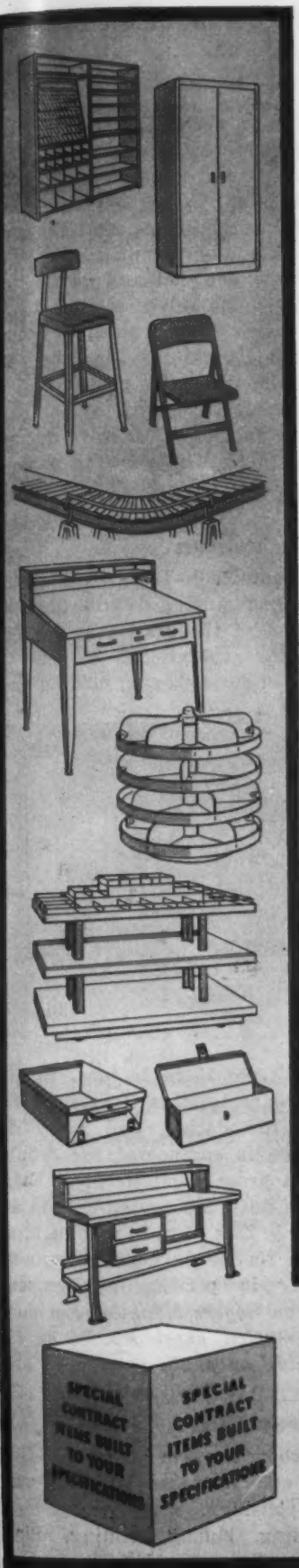

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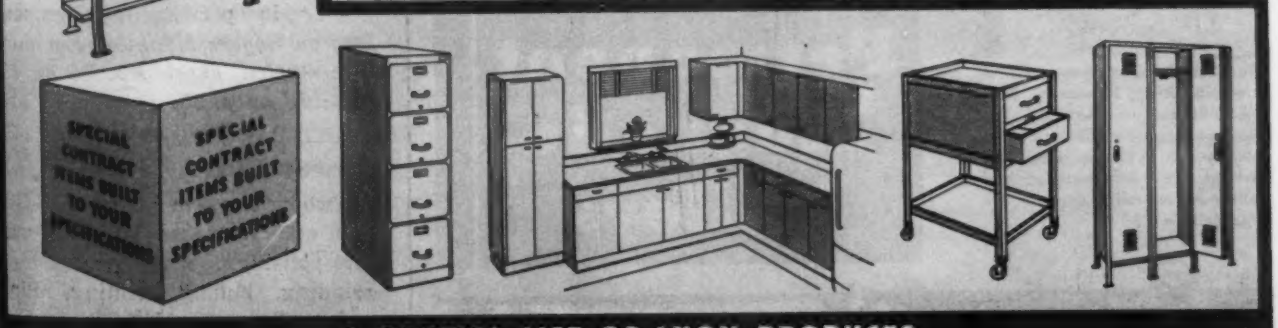

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• Lockers	• Display Equipment	• Cabinet Benches	• Bench Drawers	• Shop Boxes	• Service Carts	• Tool Trays	• Tool Boxes
• Wood Working Benches	• Hanging Cabinets	• Folding Chairs	• Work Benches	• Bar Racks	• Hopper Bins	• Desks	• Sorting Files
• Economy Locker Racks	• Welding Benches	• Drawing Tables	• Drawer Units	• Bin Units	• Parts Cases	• Stools	• Revolving Bins

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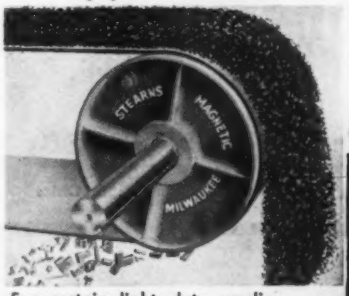
WITH WORLD'S LARGEST MAGNETIC PULLEY

Yes, sir, here's a magnetic pulley with *plenty* of pull! Especially designed to give complete tramp iron protection under heavy loads, this 60" diameter Electro-Magnetic pulley is installed ahead of a coal pulverizer at a large power station.

As an indication of its tremendous magnetic power — note how the 3" bolt has been pulled to the face of the pulley from nearly 2½ feet!

You may not require so large a pulley or magnetic separator to protect your machinery or purify your product, but whatever your requirements, consult STEARNS MAGNETIC — largest exclusive manufacturers of magnetic separation and transmission equipment. Write for Bulletin 303 today.



For certain light duty applications, STEARNS Permanent Magnetic Pulleys may be used. The best permanent magnetic pulleys money can buy, they require no wiring, are easily installed and eliminate operating expense. Ask for Bulletin 350-A.

Stearns
Electro and Permanent Magnetic Pulleys

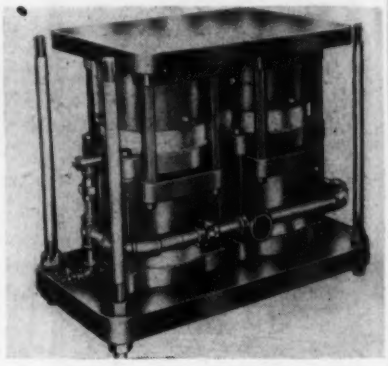
Stearns MAGNETIC MANUFACTURING CO.

635 S. 28th St., Milwaukee 4, Wis.

pressure ports for the operation of a double-acting air cylinder. The sliding, self-lapping main valve disk is shifted by a reciprocating light metal piston, that is moved by alternately admitting line pressure to one end and venting the other. The valves respond to tip-toe touch. Constructed to operate with air pressures from 25 to 150 psi, the Directaire model is manufactured in ½ and ¾ in. sizes. *Hannifin Corp. For more information, check No. 34 on the postcard on p. 35.*

Die Cushion

Adaptable to large straight side presses requiring definite precision control of the draw ring on deep drawing operations, a new die cushion develops ring holding pres-



sures from 15 to 25 tons. Special super-structure is furnished for each installation, and every die cushion is engineered for definite punch press requirements. Extra heavy duty pin pressure pads are made in 28 x 36 to 34 x 48 in. sizes. These tie the die cushion units together in permanent alignment. *Dayton Rogers Mfg. Co. For more information, check No. 35 on the postcard on p. 35.*

Power Units

Two new power units, the Jiffy Tool and the Speed Jiffy, are used for polishing, routing, brushing, grinding, buffing, drilling, filing, and sanding. The Jiffy Tool is a 3-caster floor model delivering ¼ hp at 1750 rpm through a 5 ft flexible shaft. The motor unit operates on 110 v, 60 cycle, single phase ac.

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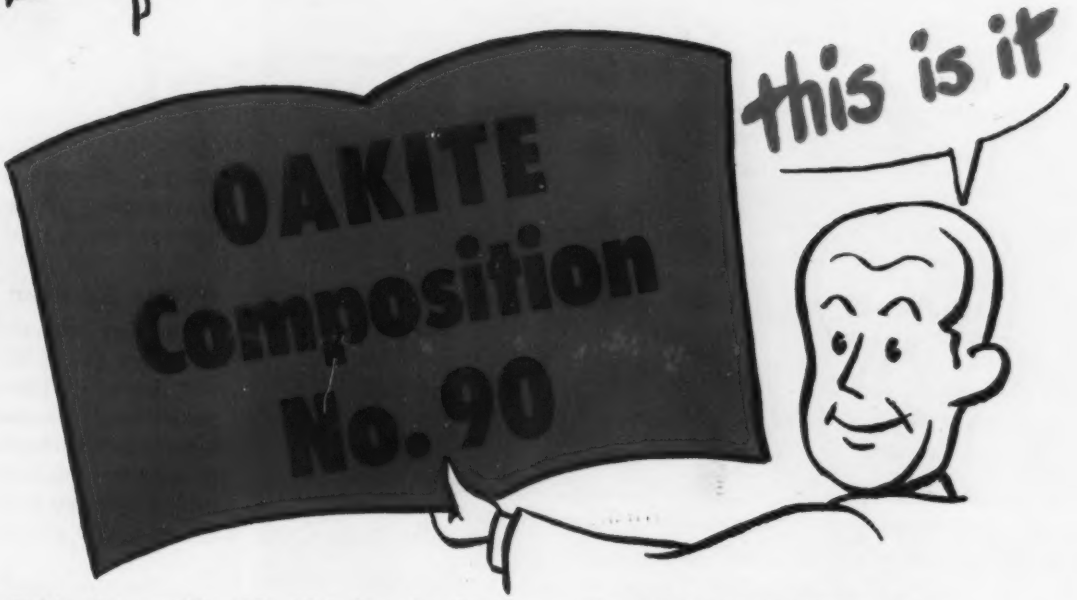
if you're looking for the best in reverse-current cleaning of steel before plating



Maybe Oakite Composition No. 90 is just the electrocleaner you need. It effectively removes oils, greases, smuts—all the objectionable films that interfere with *good plating*.

How does Oakite Composition No. 90 work? High conductivity keeps oxygen bubbling off work, prying dirt loose at a rapid rate. Wetting and dispersing action speeds up cleaning. Water softening ability prevents formation of sticky soap films. Buffering action lengthens solution life. Bubbles are just strong enough to *prevent* thick, explosive foam.

In short, Oakite Composition No. 90 meets all your needs for better reverse-current cleaning. Proof? Send coupon for electrocleaning demonstration or literature. No obligation.

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At no cost to me, send information about:

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- ☐ spray-booth water treatment
- ☐ paint-stripping
- ☐ barrel-cleaning
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FOLLANSBEE COLD ROLLED STRIP provides a continuous supply of uniform steel feeding from coils right into your automatics—regardless of the forming operation involved. Follansbee Cold Rolled Strip is a productioneer's tool. This Follansbee Specialty Steel in coils offers many time-saving advantages.

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FOLLANSBEE COLD ROLLED STRIP is a custom-made steel suitable for furniture manufacturing and a myriad other uses. Follansbee Cold Rolled Strip in coils is available in tempers and finishes for most industrial cold rolled steel requirements. Follansbee Cold Rolled Strip and Follansbee Polished Blue Strip are furnished in continuous coils to your specifications. You should be taking advantage of the custom-service on Follansbee Specialty Steels—call the Follansbee Representative nearby.

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COLD ROLLED STRIP • ELECTRICAL SHEETS • POLISHED BLUE SHEETS
SEAMLESS TERNE ROLL ROOFING
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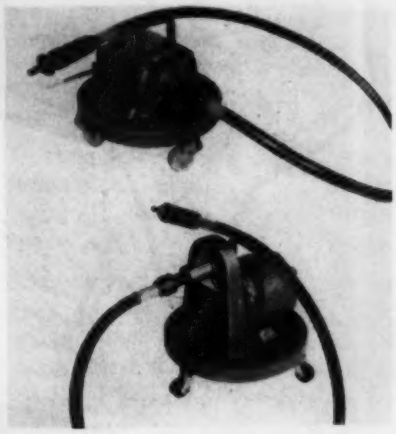
Plants—Follansbee, W. Va., and Toronto, Ohio.
Follansbee Steel Warehouses—Pittsburgh, Pa., Rochester, N. Y., and Fairfield, Conn.

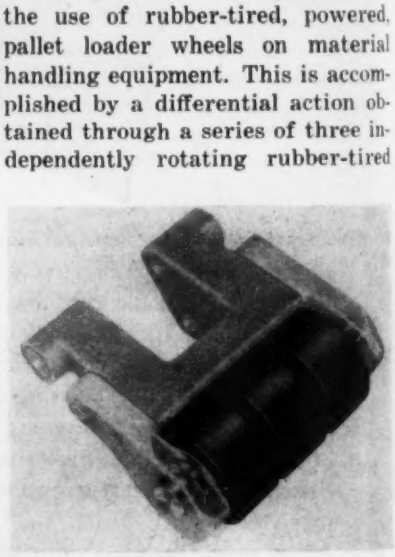
Both 1/3 and ½ hp units are available. The Speed Jiffy has three speed variations, 1000, 1750 and 3000 rpm, obtained by altering the plug-in position of the flexible drive



shaft. The belt has automatic tensioning. *Stow Mfg. Co. For more information, check No. 36 on the postcard on p. 35.*

Pallet Loader Wheels

Gouging and chipping of floors on sharp turns are eliminated by the use of rubber-tired, powered, pallet loader wheels on material handling equipment. This is accomplished by a differential action obtained through a series of three independently rotating rubber-tired



wheels. Each wheel is separated from the others on the axle by oil impregnated, anti-friction thrust washers and revolves on heavy duty oilite bushings or, where applicable, on sealed-for-life needle bearings. Wheels roll quietly on shock-absorbing, non-binding, live rubber tread. *Aerol Co., Inc. For more information, check No. 37 on the postcard on p. 35.*

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Tube Tools

A handy zip-kit contains a tube flaring tool, a cutting tool and the new Form-a-Gage. The No. 400 flaring tool selects the right size

for hand tool flaring jobs and the height gage assures the proper amount of tubing required for a good double flare. *Penn Brass & Copper Co. For more information check No.* 38 *on the postcard on p.* 35.

Capacitor Motor

A new integral-horsepower capacitor motor for use wherever power supply demands single-phase operation is of cast iron construction with capacitors mounted in the base of the motor. The conduit box

has been replaced by a built-in terminal board inside the end shield for easier wiring. A totally enclosed built-in starting switch keeps foreign matter from the contacts. In ratings from ½ to 5 hp, these high torque motors are available in capacitor-start and capacitor-run types. *General Electric Co. For more information, check No.* 39 *on the postcard on p.* 35.

Resume Your Reading on Page 39

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METAL CUTTING
JOBS
CAN BE DONE
AT
LOWER COST
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Wise Economy
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REPRESENTATION IN PRINCIPAL CITIES

Dear Editor

ELECTRIC COKE LIGHTER

Please send any additional information available on the electric coke lighter mentioned in the June issue "Newsfront" column. If you have nothing further on this, perhaps you can suggest a possible source of information.

R. D. JORDAN
Technical Asst., Shops and Foundries
Jones and Laughlin Steel Corp.
Pittsburgh

Whiting Corp., Harvey, Ill., is marketing this lighter. We have taken the liberty of forwarding your request to them asking that they supply you with the information.—Ed.

STEEL DIRECTORY

If still available, we would appreciate receiving a copy of the Directory of Tool Steel.

A. KRIEGER
Oficina Tecnica
Sola Hermanos
Buenos Aires, Argentina

While it lasts, the Directory of Tool Steel is available at $2.00 each for one or two copies, $4.50 for three copies and $1.00 each for six or more copies.—Ed.

MUNCIE'S IRON LUNG

I have read with great interest the article "Muncie's Iron Lung" in THE IRON AGE, Sept. 22, and would thank you very much to send me Mr. Reichart's descriptive folder concerning the Muncie Iron Lung. Please send Mr. Reichart and the local industrialists of Muncie my best congratulations and those of the French people for the splendid work accomplished. I am not a doctor, but I want to diffuse largely such an article in my country to show people what Americans can do for humanity.

R. DUREUIL
Paris, France

IRON BOLTS

Can you advise us of the names of manufacturers of iron rods for bolt making?

H. W. WILDER
Massey Concrete Products Co.
Chicago

A list of producers of iron rods suitable for the manufacture of bolts has been mailed.—Ed.

ORDNANCE

To my knowledge, in the past years several booklets on Ordnance production were published by THE IRON AGE. Please inform me whether you have

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DEAR EDITOR

Continued

ested in learning why such a large quantity of water is required, and whether or not salt water can be used in the process. The figure being quoted here is 17,000 gal of water per ton of steel.

W. H. HEISLER, 3rd
President
Providence Junior Chamber of Commerce

Water requirements for any given plant would depend upon whether it is fully integrated. That is, if the plant starts its production process with iron ore and coal, and operates blast furnaces and coke ovens, the water requirements are very much higher than if it purchased pig iron and scrap for refining into steel. For example, a blast furnace having a 1000 ton daily capacity in pig iron production requires about 11 million gal of water flow per day. A completely integrated plant should figure on 150 tons of water per finished ton of steel produced. However, a large proportion of the water is recirculated. Fresh water is required.—Ed.

SALT BATHS

We are very much interested in the article "Characteristics and Uses of Salt Baths," by R. C. Stewart in the Feb. 14, 1946, issue. Would it be possible to obtain a copy?

JAMES W. WELDON
James W. Weldon, Laboratory
Kansas City, Mo.

PIG IRON PRICE

I should like the average price of pig iron, southern No. 2, at Cincinnati for the year 1948 to complete a price series on which I am working. If there has been a revision of the first estimate for 1947, I would appreciate that also. I have been taking the series from the Statistical Abstract of the United States.

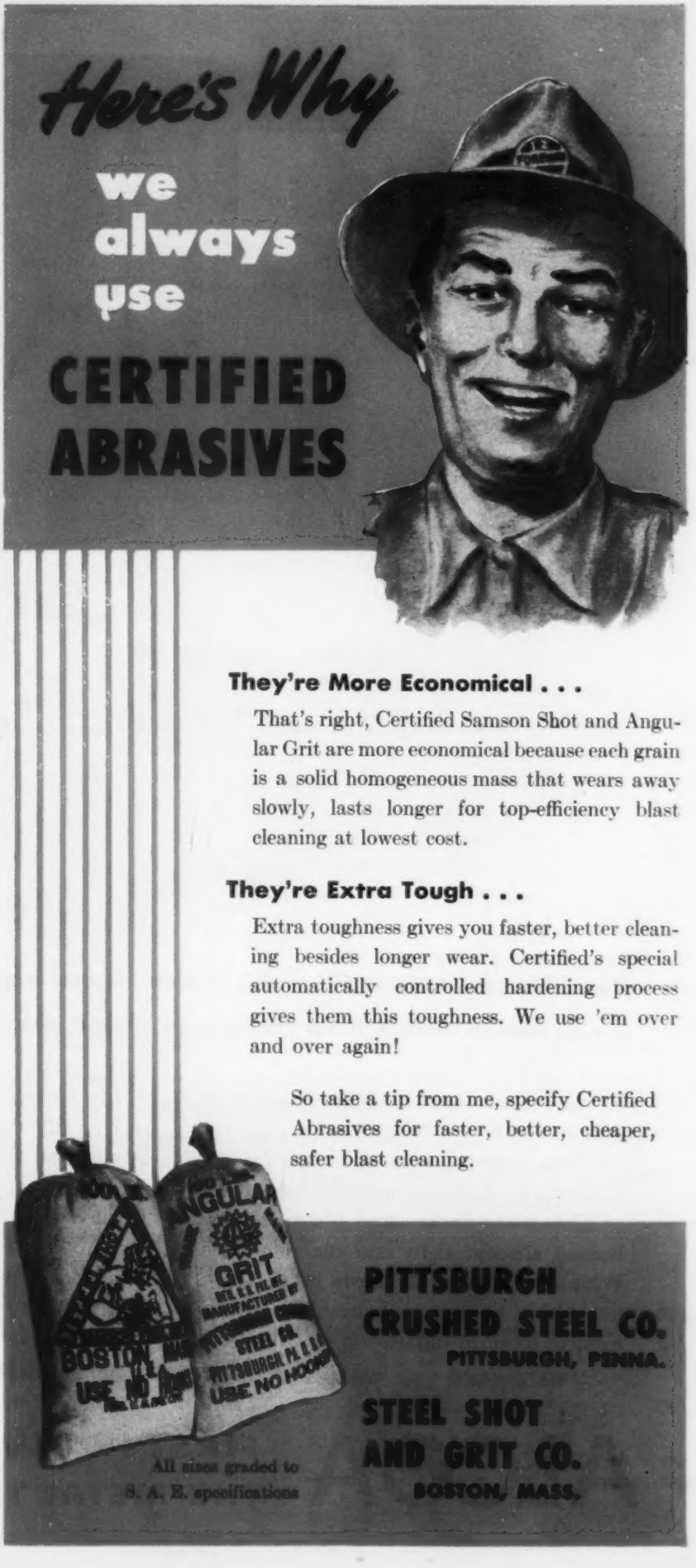
LEWIS A. MAVERICK
Professor of Economics
Southern Illinois University
Carbondale, Ill.

THE IRON AGE publishes weekly prices of No. 2 foundry pig iron from Birmingham delivered at Cincinnati, but we do not compile monthly or yearly averages. However, we have sent tearsheets from the January 6, 1949, annual review issue of THE IRON AGE, which shows the monthly and yearly averages at Birmingham. The differential of Birmingham over Cincinnati was $5.85 through May 6, and $6.09 for the balance of the year. This should allow you to calculate the Cincinnati delivered price.—Ed.

REFRACTORY METALS

I would appreciate receiving a copy of "Vapor-Phase Deposition of Refractory Metals," which appeared in the June 16 issue.

MURRAY M. JACOBSON
Watertown Arsenal
Watertown, Mass.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CERTIFIED ABRASIVES
They're More Economical . . .
That's right, Certified Samson Shot and Angular Grit are more economical because each grain is a solid homogeneous mass that wears away slowly, lasts longer for top-efficiency blast cleaning at lowest cost.
They're Extra Tough . . .
Extra toughness gives you faster, better cleaning besides longer wear. Certified's special automatically controlled hardening process gives them this toughness. We use 'em over and over again!
So take a tip from me, specify Certified Abrasives for faster, better, cheaper, safer blast cleaning.
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You'll bless the SOLE PLATE of this modern, lighter iron.

It puts heat to work without unnecessary weight, thanks to ALCOA ALUMINUM.

Do you realize that a *lighter* iron can do a *better* job?

When your iron has an aluminum sole plate cast by Alcoa, it means one pound less to lift at every stroke. And Alcoa casts the heating element right into the sole plate. With aluminum's well-known heat conductivity, this means quick heat, evenly distributed to all of the ironing surface.

Light weight, corrosion-resistant cleanliness, and fast heat transfer make Alcoa Aluminum worth looking for in all kinds of electric appliances—from washers to waffle bakers. Appliance manufacturers will find sixty years of aluminum knowledge available through the nearest Alcoa sales office. ALUMINUM COMPANY OF AMERICA, 661Y Gulf Building, Pittsburgh 19, Penna.

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THE METAL THAT LASTS

A **BULLARD SPACER** applied to Radial Drills has proved its worth in Savings by eliminating many costly jigs previously required on many drilling operations.

Almost unbelievable operational Savings have also been made.

However, Accuracy is only as good as the accuracy of the Drill to which the Spacer is applied. To assure the Accuracy of which the spacer is capable, Cincinnati Bickford offer their Super Service Precision Drilling Machine.

With a Precision Spindle in the drill, this combination is *Hard to beat* on reproduced Accuracy of hole spacing, drilling, reaming and tapping.

Installations of this type are proving Profitable investments in numerous plants. Ask Bullard or Cincinnati Bickford about this "Natural" combination.

THE BULLARD COMPANY

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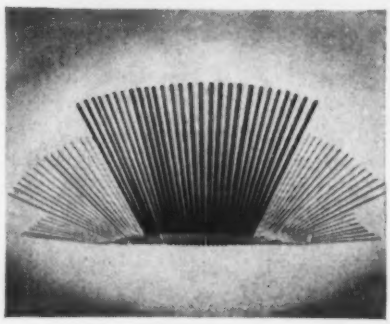
FACTS AVAILABLE ON "SELECT 70"



DESCRIPTIVE literature covering mild steel, low alloy and special steel, stainless steel, hard surfacing and build up and other special electrodes is available to those requesting full information on M & T's "SELECT 70"— seventy electrodes designed to cover all arc welding requirements—AC or DC, all-position or downhand work welding of mild steel, low alloys and stainless steels as well as hard surfacing and building up of worn parts.

Literature is brief but comprehensive, covering specifications, properties and applications for each electrode. Copies available on request received on company letterhead. Address Metal and Thermit Corporation, 120 Broadway, New York 5, N. Y.

ACCESSORY DIVIDENDS DECLARED

UNDERSCORING the importance of proper accessories to top welding performance, more and more fabricators are taking pains with selection of accessories. Speedier, lower cost, safer and improved welding are assured when such items as helmets, shields, holders, connectors, cleaning tools and protective clothing are carefully selected. And more and more fabricators—sold on M & T electrode and arc welder performance — are specifying the M & T line of "accessories to the perfect weld." For descriptive literature, address Metal and Thermit Corporation, 120 Broadway, New York 5, N. Y.

FATIGUE CRACKS

Continued from Page 20

FOR SALE

One doz. crystal balls, invaluable in any research laboratory, together with one complete set "The Astrologer's Companion".

HELP WANTED

3 laboratory assistants 10-14 years of age, with Ph.D., to wash glassware and sweep floors. Must be able to read, speak Tai-Chin, Pantu, and Papuan. At least 10 years' previous experience required in executive engineering work. Last Chance Employment Agency, RFD O, Point Barrow, Alaska.

Atomic energy research workers, with intimate knowledge of procedures at Oak Ridge operation. 3,000 rubles per month and early retirement in Siberia. J. Stalin, The Kremlin, Moscow, Russia.

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Highest prices paid for bottled lightning bolts, regardless of thread or length, and suitable nuts with straightjackets for same. Lemuel Gulliver, Lilliput Isle, South Pacific.

Will trade 10,000 Army Air Force sky hooks for equivalent number of old fence post holes, delivered in Washington, D. C. Private Kilroy, The Pentagon, Washington, D. C.

We don't doubt the method behind this madness. A simple check of the readership of the entire classified section would probably run off the top of the meter.

Stainless

One of the vexing problems long facing oil producers has been the search for noncorrosive or "restless" piping with which to draw off salt water from crude oil deposits.
—Christian Science Monitor, Nov. 1, 1949.

The oil producers had better put an end to this fidgeting soon, or that pipe may stain its reputation by running off with the deposits.

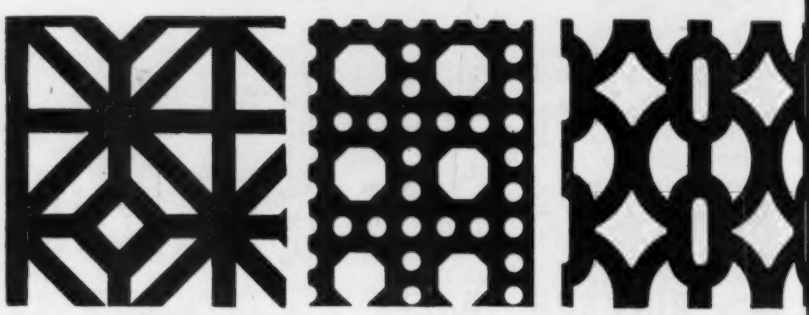
Aptronyms

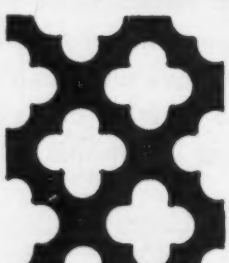
To qualify as a true aptronym, in the best traditions of this department, the name must fit the job exactly. Your f.f.j.'s Joe Halloran, field agent for the East Coast, submits the following with qualifications:

Dr. Ovary, obstetrician, New York. (We'll admit the doctor, provided he practices gynecology concurrently.)

Jim Wood, general manager, Thomas Coal & Lumber Co., Philadelphia. (O. K., but use the nickname "Sooty" on the membership badge.)

Resume Your Reading on Page 21





Ornamental perforated metal

Hendrick offers a wide variety of decorative patterns in light weight, perforated metal, for radiator enclosures, stove panels, kitchen cabinets, and similar applications.

Regularly furnished in steel sheets of available stock size, in gauges from 16 to 22. These patterns can also be supplied in other metals on special order. Write for full information.

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Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and Armorgrids

AARON MACHINERY CO., Inc.

AUTOMATICS
Brown & Sharpe #00G, H.S. #4 & 6
Conomatic 8 sp. 1⅞" cap.
New Britain Gridley 6l—2¼" 6 Sp.

BORING MILLS
Giddings & Lewis #6, #25T
Lucas #31 horiz.
Universal 3" horiz. equipped

DRILLS AND RADIALS
Cincl-Bickford Sup. Ser. 21", 24"
Royersford Excelsior 21"; Foote Burt 6 sp.
Natco Model E-5 Multi-Spindle, 14 Spindles
Canedy-Otto 3'-9" col.
Carlton 8'-19" col.; Allen 6 sp.

ENGRAVERS
Gorton #3U, 3Z, 2 dimensional, 3L, 3 dimensional
Gorton Cutter Grinders 375-2, 265-8
Deskel GI

GEAR EQUIPMENT
Fellows #7, #72, #725 High Speed Shapers
Mikron Gear Hobber
Fellows, Michigan, Gleason Checkers

GRINDERS, MISCELLANEOUS
Brown & Sharpe #5 cyl., 3" x 18"
Brown & Sharpe #1, #3 Univ. #13 Tool
Cincinnati #2 Centerless Filmatic, 12 x 36 Univ.
Cinc. 12 x 48" Univ., Gardner #226, 30" disc.
Covel #91A Univ. Tool & Cutter, Hammond #4
Heald 72A3 Int. Centerless Sizematic, #1 Tool
Landis #4H Cyl. 4x12". Centerless, #6 Thread
Norton #2 Tool & Cutter, Type C, 6x30"
Oliver #516 Drill Pointer, Sellers 4G, Black D'mond
Pratt & Whitney Radius #R6, K.O. Lee Tool
Porter Cable Belt W98, G8; Greeby Int.

GRINDERS, SURFACE
Abrasive #1½ Wet Hand Feed, #33, #34, Vert.
Blanchard #18, 42" Mag. Chuck, #11—18" chuck
Brown & Sharpe #2
G. & L. #25, #33 Hyd. Feed
Hanchett 300 series, 12x48" with chuck
Mattison 14x16x48 with chuck; Hammond #2
Norton 6x18" Hyd., Atlantic 6x18" Power Feed
Reid #2A P.F. MIB., #2C Pope Spdl.
Pratt & Whitney 12x36" Vert.
Thompson Hyd. 8x10x18", 6x12x18"

LATHES
Hardinge Precision 9", 1" Collet Cap., Rivett
Hendey G.H. 16x30", Rel. Att., Bradford 18"x8'
LeBlond Regal 18x36", 21x50", 10"x3½', 19x48"
LeBlond Heavy Duty 18x33"
Lodge & Shipley 16x78" T.A., Collets, etc.

High Speed Vertical Mill

Monarch 10"x20" EE, 15x78 G.H., 12x30"
Sebastian 12"x4' G.H.
Sheldon 11"x24", Logan 10"x30"
South Bend 13x36", 14½"x9', 10x4, 9x3, 9x3½

MILLS, PLAIN, UNIVERSAL & PROD.
Brown & Sharpe #000, 12, 2I, #2A Univ., 2B PL.
Burke #4 Plain & Univ. Vert. Hd.
Cincinnati 2MH Univ.—1-12, 1-18, 2-18 Mfg.
Kent Owens #1V; U.S. Hand Mills
Milwaukee #2HL, 2H Univ., #2HL, 2H Plain
Nichols Hand. Vert. Hd.; U. S. Multimiller
Sundstrand 00 Rigidmill; Whitney Hand Mills
Van Norman #12, 22L, 38; U. S. 1 & 2 sp.

MILLS, VERTICAL
Bridgeport Vert. Slotter, Hor. Sp.
Brown & Sharpe #2
Cincinnati #4
Gorton #8D, 8J Plain, 8½D Duplicator
Sip Jig Borer #MP-5
Index, Jackson, Vernon
Milwaukee 3H, 5H
Moray #12M Profiler 2 sp., P. & W. 12B
P. & W. 1½B Jig Borer, Moore Jig Grinder

PRESSES
Bliss 675, 850, 645B Hi-Production Presses
Bliss #8 Dbl. Crank, Bed 42"x100"
Bliss 19, 20, 21 OBI, 58, 62, 62A 102 OB.
Bliss #4½ Double Action, Roll Feeds
Henry & Wright 75 Ton Dieing, 25 Ton

HYDRAULIC EQUIPMENT

Cap.	Manufacturer	Platen	Stroke	Opening
500 Ton	Lake Erie	55x36"	30"	68"
600	Bald.-D'thw'k	76x59"	22"	36"
500 D.A.	H.P.M. (100 Cushion)	36x36"	24"	39"
1000	French Oil	53x42"	20"	50"
300	Brand New Watson Stillman Hobbing Press			
375 D.A.	Elmes (90 Cushion)	84x44"	12"	42"
350	Verson	40x40	36"	72"
50	Dennison	22x20	18	28
150	Southwark	84x30	30	2' to 4'

UP MOVING RAM PRESSES
50 & 100 Ton Stokes Molding Presses & Pumps
300 Ton Dunning & Boschert Molding Press
500, 800 Ton Waterbury-Farrel 3 & 4 Rod Presses, 6 & 8½ strokes
300 Ton Watson Stillman Press, 24x20" Platens
400 & 500 Ton Shaft Straightners—Self Contained

All Hydraulic Equipment is completely engineered and checked by a competent staff, thus assuring reliability. Send us your Hydraulic problems.

NEW IN STOCK
Air Hydraulic Presses—Arbor Presses #6C Famos—Band Saws Kalamazoo—Drill Presses all sizes—Grinder Surfaces, Abrasive #1½—Hydraulic Press Northern 70 Ton—Injection Molders, 1 ounce—Power Presses, OBI, 4½, 5, 7½, 18, 12, 18, 30 ton—Shaper, 7" Ames, 8" Shaperite—Shaper, Sheldon 12"—Shears, Foot 22" to 8', 16 & 18 ga.—Shears, Power, 3'x18 gauge to 10'x10 ga.—Welders, Arc, Seam, Spot all sizes—Vert. Milling Attach. Hales. H.S.—Motors, Grinders, Buffers, all sizes

Thomas 80 Ton O.B.I. #7A, Z & H 30 Ton
Toledo 400 Ton Knuckle Joint
V. & O. #25B O.B.I., #102 O.B.I. Reducing, #6

TURRET LATHES
Asmo #6W Bar & Chuck, Asmo 6W Fox
Bardons & Oliver #3, 1½" cap., #5, #2
Brown & Sharpe #1, 2F, Hand
Gisholt #4, 3 Bar & Chuck, 1L, Foster #3B
Hardinge ESM Second Operation
J. & L. 8A—Well Tooled
Moray #3, 1½" cap.
Oster #601 Rapiduction, well tooled
Warner & Swasey #5, 4, 3, 4A Universal

MISCELLANEOUS
Band Saw: Tannewitz #36M, DoAll ML
Bending Roll; Buffalo #0, ½WR, Excelsior #14
Hacksaw: Marvel #4B, 6A Automatic #6
Hardness Tester: Clark
Hone: Micromatic #H-1, Sunnen Rivetors: HI Speed
Keyseater: Davis, Baker, M & M
LaPointe #3L Horiz. Hydr.
Press Brake: Chicago #33S
Router: Onsrud #W240, 55
Saws: Wells, Catskill, Peerless, Kalamazoo
Shaper: Gould & Eberhardt 32" Univ. Industrial, Latest
Slotter: P. & W. 6" Vert. Shaper
Shaper: 8" Shaperite, 7" Atlas
Shear: Pexto 6'x14 Ga.
Tappers: Bakewell #1, Haskins #2C, 3C
Thread Roller: Waterbury-Farrel #30 with Dies
Welders: Seam & Spot; Thompson, Taylor-Winfield, Sciaky

This is but a partial listing. Write for free Catalog. Inquiries Invited.

AARON MACHINERY CO., Inc., 45 Crosby Street, New York 12, N. Y.
"CABLE—AARMACH N. Y." Telephone WOrth 4-8233

BORING MILL, Vert. 14' Niles, 2 Hds., M.D.
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HAMMERS, Pneumatic Nos. 4B & 6B Nazel
HAMMERS, Steam Drop, 2,000# Chambersburg
MILLER, Ingersoll, 36x48x16', 3 Hds., M.D.
MILLER, Vert. No. 4 Kempsmith, table 18" x 76"
PLANER, O.S 72" x 72" x 16' Cinc. Hypro, '43
PRESS, Hyd., 250-Ton Chambersburg, 30" x 36"
PRESS, No. 59 Toledo, Str. 12", Bed 30" x 30"
PRESS, No. 59¾ Toledo Str. 14", Bed 36" x 37"
ROLL, Bending, 10' x 1" Wickes, Pyr. Type
SHEAR, Plate, 132" x 1½" Morgan, 26" Throat
SHEAR, Plate, S-6156 Pexto, 156" x ¾"
SHEAR, Plate, No. 4 H&J, cap. 10'x¼", M.D.
STRAIGHTENER, 17-Roll McKay, 54"x4¼"
STRAIGHTENER, 48" American, 13-Rolls, 2¾"
UPSETTERS, 6" Ajax and 2" Acme

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Reed-Prentice No. 1½G Die Casting Machine.
Fisher Body Type P-125A Welder.
H.P.M. 100-ton Hyd. Press, Model 10-9SL.
South Bend 14½"x6' Toolroom Lathe, 1947.

D. E. DONY MACHINERY CO.
47 LAURELTON ROAD, ROCHESTER 9, N. Y.

3" UNIVERSAL "TRI-WAY" Horizontal Boring Mill

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#3H Kearney & Trecker Plain Miller
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ROLL LATHE

18" Lewis Worm Drive Roll Lathe. 1942. Between centers 10'6". Bed 16'6" long. 15 HP 400-1600 RPM 230 v. DC motor. C.H. Mag. Controls.

F. H. CRAWFORD & CO., INC.
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THREE MONTHS ACTUAL SERVICE PURCHASED NEW JULY, 1948

MANUFACTURED BY ETNA STANDARD, CAPACITY FROM 14 GA. TO 20 GA., 9 TOP ROLLS, 8 BOTTOM ROLLS, 51" x 4" DIA. ROLLS, FORCED FEED LUBRICATION, COMPLETE WITH D.O. JAMES SPIRAL BEVEL REDUCTION UNIT, AND 20 HP, 230 VOLT, DC MOTOR AND CONTROLS.

THIS MACHINE IS EQUAL TO NEW IN EVERY RESPECT

Special Offering for Immediate Sale $9,500.00

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INDIANAPOLIS 4, INDIANA

COST SAVINGS START HERE

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Lodge & Shipley 14" x 6' & 8'—12 Spd. Sel. Gr. Hd. 33" & 57" centers, Motor in base—attchmts.

(New) Hendey 14", 16", 18"—12 Spd. Gr. Hd. 30" and 54" centers, Motor in base—attchmts.

Monarch 18" x 56"—16 Spd. "MBB" Gr. Hd.—22½" swing, Rapid traverse Keller Tool Control—1948

Monarch 22" x 96"—16 Spd. "CM" Gr. Hd.—24½" swing—1942

Monarch 20" x 72"—16 Spd. Gr. Hd. "M" 22½" swing, Monarch auto. sizing control (very late)

TURRET LATHES

Bardons & Oliver #3, 12 speed Ram Type Univ.—100 to 1525 rpm—1⅞" hole—18" turning length—15⅜" swing, bar & chucking

W & S #3—1½" Cap.—#4—2" Cap. Ram Type Univ., bar & chucking—tooling

J & L #5—2½" Cap. Ram Type Univ.—rpd. trav. to cross slide—bar & chucking (very late)

Gisholt #5—2½" Cap. Ram Type Univ.—preselec. Hd., Thread attchmt.—bar & chucking, tooling

MILLING MACHINES

Cinn. 28"-60" Vertical Hydrotel—wkg. tbl. 28" x 83"—range 60" x 14" x 26"—low series 22 to 550 rpm.

Reed Prentice #4 "Improved" Hydraulic—wkg. tbl. 70" x 24"—18 spd. 30 to 1200 rpm—power feed to head—1945 mach.

Cinn. #2 Rect. Over.—motor in base—wkg. tbl. 49" x 10½"—range 28" x 10" x 19" rpd. trav.—plain horiz.

Milw. #5H Med. Spd. plain horiz.—wkg. tbl. 94" x 18"—range 52" x 16" x 20"—rpd. trav. all direc. (late)

Cinn. #1M Rect. Over. motor in base Universal—wkg. tbl. 40" x 10½"—range 22" x 82" x 18"—rpd. trav.

Van Norman #2SU Knee Type Universal—wkg. tbl. 50" x 12"—range 28" x 10" x 17" attchmts. (very late)

GRINDERS

B & S #2, 14" x 30"; #4, 14" x 60" Universal—Tooling & attchmts. (very late)

Cinn. 14" x 72" Univ. Hydr.—Film Brg. (very late)

Norton 10" x 18" Mech. & 10" x 36" Hydr. Type "C" (late)

(NEW) Rafter All Steel Squaring Shears—available in two sizes—¼" x 10' mild steel and 3/16" x 12" mild steel—stock delivery

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5 SHERMAN ST. WORCESTER 1, MASS.

PRACTICALLY NEW

MODEL #150 DEFIANCE HYDRAULIC HORIZONTAL BORING, DRILLING AND MILLING MACHINE, TABLE TYPE

5" DIAMETER BAR, QUICK CHANGE FEEDS & SPEEDS, LENGTH OF BED 10', WORKING SURFACE OF TABLE 48" x 84", SERIAL NO. 1606-42. MFD. IN 1942. PRICE.....$17,500.00

WILL TRADE FOR OLD STYLE CONE DRIVEN MACHINES

ACTUAL PHOTO UPON REQUEST

IN STOCK FOR IMMEDIATE SHIPMENT

WINSTON MACHINERY COMPANY, INC.
517 South Delaware Street, Indianapolis 4, Indiana

Continued from Page 138

for August is said to be from 15 to 30 pct better than July, while the September sales were 25 to 45 pct above the low of July. Most dealers report that October and November also conform to the uptrend.

Exports of Machine Tools Reported Off in New England

Bridgeport—Dealers report that export sales from this area have fallen off during the past year. Machinery firms, whose previous experience has been that when the local market was slow the export market was moving, and vice versa, found that this usually balanced out, giving a more or less constant yearly business. They now find that both of these sources are slow and that resultant total business is decidedly lower than it has been for the past few years. With regard to devaluation, they can't see that the lower priced European currency has either helped or retarded sales.

These dealers report that exporting now amounts to an appreciably smaller part of total sales. One dealer whose export sales amounted to about 40 pct of total sales in recent years now reports that this portion now only amounts to 15 pct of the business.

Austin D. Lucas Co., Inc., Announces New Vice-President

Bridgeport—Howard A. Pennington was recently made vice-president and member of the board of directors of Austin D. Lucas & Co., Inc. Mr. Pennington has been with the firm for 4 yr, having been a Lincoln Electric Co. representative for the previous 9 yr.

Machine Tool Service

New 24-p. catalog in color describes the machine tool service offered by this machinery company and lists rebuilt production tools offered for sale. Many of the machines are illustrated. *Miles Machinery Co. For more information, check No. C1 on the postcard on p. 35.*

Resume Your Reading on Page 139

CIMCO MACHINE TOOLS AT BARGAIN PRICES

BORING MILLS

Bullard 24" New Era, Vertical
Bullard 54" Maxi Mill
Lucas #31, 3" bar, Horiz.
Cincinnati Gilbert 3½" bar, Horiz.
P & H Floor Type, Horiz, 4" spindle

DRILL PRESSES

Leland Gifford 24" Single Spindle
Coburn #4, Mfg. Type Single Spindle

RADIAL DRILLS

American 3½' Triple Purpose
American 5' Triple Purpose
Carlton 5', Ball Bearing
Fosdick 5' 14" col.

GRINDERS

Brown & Sharpe #13, Univ. & tool
Landis 4x12 Type H, Plain Cylindrical
Landis 10x24, Type C, Hydraulic
Heald 70A Internal (1941)
Excello 31L, Precision Thread
Norton 6x18, Surface
Thompson 12 x 16 x 16 Surface Grinder
ExCello #35L Precision Thread Grinder
Gallmeyer & Livingston #4 Univ. Tool Grinder

LATHES

Lodge & Shipley 14" x 30" centers, Late model
American Pacemaker 16" x 78" centers (1941)
Lodge & Shipley 18" x 8' bed, Selective Gear Head
Sebastian Streamliner 20' x 8' centers
American 24" x 10' bed, G. H.
American 24" x 14' bed, 8 speed, G. H.
American 42" x 14' bed, Internal Face Plate Drive
Sidney 24" x 168" centers, equal to new
Niles Timesaver 30" x 10' centers

MISCELLANEOUS

Cincinnati #3 Dual Type Medium Speed, Plain Miller
Cincinnati #3 High Speed Dial Type Plain Miller
Warner & Swasey #5 Turret Lathe, Preselective Head
Rockford 16" Hydraulic Shaper, Late Type
Van Norman Model 666, Crank Shaft Grinder 20 x 48
Cincinnati Bickford 21" Upright Drill Press

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IMMEDIATE DELIVERY!

HOT ROD MILL complete with Motor, Controls and large quantity of extra equipment.

3 CONTINUOUS STEEL ROD 5-DIE WIRE DRAW BENCHES arr. M.D. (Cap. #5 Rod).

4 CONTINUOUS NONFERROUS ROD BENCHES for Wet Drawing arr. M.D. Complete with string-up machines and pointers.

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"IF IT'S MACHINERY, WE HAVE IT"

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Supersonic Inspection

... guards the quality of Bethlehem Tool Steel

Millions of electrical impulses per second probe into billets and bars of Bethlehem Tool Steel, searching for possible voids, piping, or other deviations from high quality. A unique instrument, known as the Supersonic Reflectoscope, makes possible this remarkable examination of a tool steel bar's internal condition by sending high-frequency sound waves through the steel and "bouncing" them back.

Bethlehem applied this inspection method to tool steel and established its reliability over a period of nearly four years. It is especially useful where our past experience has indicated the value of this additional precaution in certain bar sizes.

To users of Bethlehem's fine tool steels, supersonic inspection means a big step forward in the direction of additional quality control. It gives real assurance of soundness, cleanliness, and freedom from flaws in the cross-sections of tool steel bars.

When you need tool steel . . . no matter what the application may be . . . you can count on the ultimate in quality by specifying Bethlehem. The complete range includes: Carbon, Oil- and Air-Hardening, Shock-Resisting, High-Speed and Hot-Work grades.

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BETHLEHEM, PA.

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Bethlehem SUPERSONIC TESTED Tool Steel

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Editorial

Beware of the New Virus 7

News Interpretations

Newsfront 11
The Iron Age Summary 15
Global Letter 26
Machine Tool Highspots 32
On the Assembly Line 40
West Coast Progress Report 44
The Federal View 48

Special Features

Fatigue Cracks 20
Iron Age Introduces 22
Free Publications 34
New Production Ideas 35
The Economic Side, J. S. Lawrence 118
Dear Editor 170
Dear Customer 182
The Clearing House 186

Technical Articles

Engineering Aspects of Nodular Iron Castings 79
Chromium Plated Cylinders 86
Bonding Aluminum on Steel 90
Air Hardening Tool and Die Steels, Part II 91
Welding of Thermoplastics 96
Materials Handling at Champion Rivet 98

Spot News of Industry

American Firms Sign for Q-L Ore 109
Steel Industry in Snappy Comeback 111
Industrial Shorts 112
Dates to Remember 113
Canada Steps up Cobalt Output 114
Townspeople Happy About Phoenix Buy 117

Markets & Prices

Market Briefs and Bulletins 129
Nonferrous Metals Outlook 130
Nonferrous Prices 131
Iron and Steel Scrap Market 132
Iron and Steel Scrap Prices 134
Comparison of Prices 136
Steel Prices 138
Miscellaneous Steel Prices 140
Stainless Steel, Pipe and Tubing Prices 141
Warehouse Steel and Pig Iron Prices 142
Ferroalloy Prices 143

Index to Advertisers 200